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PERCEPTIONS, VIEWS, COMMENTS

SOVIET VIEWS ON U.S. AUTOMATED TROOP CONTROL SYSTEMS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 8-15

[Article by Candidate of Technical Sciences, Engr-Lt Col V. Tamanskiy: "The Automation of U.S. Armed Forces Control and Command"]

[Text] American imperialism, being the most reactionary force of the modern world, is wagering particularly in its aggressive plans on the armed forces which are the chief weapon for carrying out its domestic and foreign policy. Even in peacetime the Pentagon has deployed major troop groupings both on the continental United States as well as abroad in all the more or less strategically important regions of the world. Considering their dispersion and the increased scope in conducting operations, the U.S. military-political leadership has given great attention to improving the armed forces control system.

As has been pointed out in the American press, at present control of the U.S. Armed Forces is carried out by the so-called global operational command system (GOCS). It includes around 130 bodies and command posts of strategic and operational-tactical levels (from the Joint Chiefs of Staff to the commands in the zones and theaters of war) employing modern means of communications and computers. The effective functioning of such a complex system, according to information in the American press, is possible on a basis of extensively employing diverse technology for the collection, processing and transmitting of information and operating according to a single plan within interlinked automated control systems (ASU).

According to data in the foreign press, the ASU are viewed by the U.S. military leadership as a tool making it possible for the command to most efficiently utilize the field forces and formations. A modern ASU for armed forces, in the opinion of foreign military specialists, should include control bodies, command posts (control centers) with sets of equipment for collecting, processing, displaying and transmitting information; subsystems of information sources on the enemy armed forces (including equipment for observation and warning of a nuclear missile strike); dependable communications systems; navigation systems the main function of which is to determine the position of one's own armed forces and primarily the carriers of strategic and operational-tactical nuclear weapons.

The equipment of the basic command center of the JCS even in peacetime ensures the automated collection, processing and screen display of data of the current situation and additional reference information on individual questions. The center's computer includes standard programs for the variations of employing the armed forces under various situational conditions. The following automated command and control systems have also been established: the DACCS for the ground forces, the AFCCS for the Air Forces (developed under the 473L Project), 465L for the ICBM forces and strategic aviation, the basic complexes of which have been deployed at the command posts of the Army, Air Force and SAC staffs with terminals at the controlled installations. At the command post of the Navy Staff there is the NAVIC Information Center and its mission includes the automated processing of incoming data. At the basic command post of the NORAD commander there is the 425L automated system which provides for the automated collection, processing and display of data on the aerospace situation and the transmitting of attack warning signals to more than 200 staffs and 260 individual posts. Many other command posts are also outfitted with modern control equipment.

The general technical policy and centralization of leadership in the area of automating control and command of the armed forces, as is evident from the Western press, are an indispensable condition for achieving the most rational and comprehensive use of the enormous diversity of automated systems and equipment comprising them within a unified plan. American military specialists feel that for carrying out this policy, a systems approach is required, that is, one of the modern areas of investigating complex systems characterized by a common functioning goal, by a hierarchical control structure, by the presence of subsystems with specific goals and a diverse information network which ensures their efficient functioning. Such an approach makes it possible to view the properties of the control system comprehensively in all its elements and to find the linkages between its component elements. Here consideration is given to the relationship and reciprocal influence of the component elements of the control system and the other support systems which influence or can influence the work of the control bodies.

According to materials published in the foreign press, the command of the U.S. Armed Forces divides all the ASU into three types: strategic, for a theater of war and tactical (that is, it is a question of automating control processes on the strategic, operational and tactical levels). Centralized leadership over automation problems in the Pentagon has been entrusted to the assistant secretary of defense for communications, control systems and intelligence (he is also the first deputy secretary of defense for research and development and equipment). He has four deputies. One of them is the chief of the agency for communications, control systems and intelligence (Fig. 1) [Figures not reproduced].* The assistant secretary of defense through the bodies under him provides overall coordination and financing of work in the area of automating control, he outlines long-range plans and programs coordinated with the secretaries of the Armed Services for developing new systems, he monitors the course of carrying out current programs and works out instructional documents for the departments of the Army, Air Force, Navy and the agencies of the Department of Defense.

Moreover, under the JCS a special agency has been formed for control and communications systems (Fig. 2) and this coordinates work in the area of working out demands on the long-range systems and conducts measures to modernize the existing systems. Leadership over analogous work in the departments of the armed services, the special and joint commands is provided by the appropriate officials and their subordinate bodies.

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*The organizational structure of the agency is now being revised. Editors.

Increasing the stability of control, in the opinion of the command of the U.S. Armed Forces, is one of the most important demands placed upon the automated control systems, particularly those of the strategic level, since in modern warfare they will be exposed to enemy actions. Increasing the survivability of the command posts, the reliability of work and resistance to jamming for control equipment is considered to be the basic direction for achieving highly stable control.

Within the measures to increase survivability, the Pentagon gives a particular place to the command posts which control the strategic offensive and defensive forces. A practical measure in this area has been the creation of a system of ground, underground and airborne command posts, primarily in the interests of the JCS, SAC, the Navy (for the control of ballistic missile nuclear submarines) and for the North American Air Defense Command.

The American press has emphasized that in conducting an all-out nuclear war, of all the command posts only the airborne ones will possess the required survivability and can control the armed forces under any conditions. For this reason it is no accident that the United States for a long time now has been carrying out a step-by-step modernization of its existing airborne command posts and is creating new ones based on the Boeing 747 aircraft. The latest version of this command post which has been named the E-4B and designed for use in the interests of the JCS and SAC (there are plans to have six aircraft) surpasses its predecessors in terms of automation equipment. Its distinguishing features are: the use on board of data processing and display equipment which creates conditions, independently of the ground command posts, for taking sound decisions on the control of the armed forces; broadening the range of communications equipment operating on various wave lengths and due to which, in the opinion of foreign military specialists, even with atmospheric nuclear explosions and strong electronic countermeasures, can transmit commands to subordinate control posts and receive the necessary information from them.

A particular problem for the Pentagon has been achieving the viability of control equipment for the nuclear subs. At present the transmitting of commands to them and the receiving of reports are carried out either directly from the shore long-wave communications centers or by using the EC-130Q relay aircraft of the TACAMO system. In both instances the long-wave and medium-long-wave bands are used for communicating with the subs.

In considering that the existing system for controlling the nuclear subs does not fully meet modern requirements, the command of the U.S. Armed Forces is reviewing a program for replacing the TACAMO system aircraft and the communications equipment carried on them by new equipment which should provide dependable operation with atmospheric nuclear explosions and strong electronic countermeasures. At the same time work is being done to develop a system for communicating with the nuclear subs operating on super-low frequencies (tens of hertz, the Seafarer Project).

Increased operational reliability of the armed forces control system is to be achieved by improving the equipment and introducing it on the staffs and in the troops while resistance to interference is to be raised by the integrated use of various devices for receiving and transmitting information, in operating in different wave lengths (from super-low to super-high frequencies).

Broadening the sphere of use of the interrelated strategic, operational and tactical automated systems, as the U.S. military political leadership feels, is a condition for achieving the required effectiveness of troop control under present-day conditions. The problem is that up to the present, as has been emphasized in the foreign press, the United States has not had a single unified automated control system for a theater of war. In the various armed services, ASU have been developed or are undergoing testing with a limited range of functions, for example: controlling troop actions on the battlefield, control of tactical aviation, control of field artillery fire and a number of others. But each of these functions virtually autonomously without being incorporated in a unifying system. The creation of an interrelated complex of ASU functioning according to a single operational-technical plan on all levels of control involves a solution to the problems of their operational, informational and technical linking.

In the opinion of the American command, combat operations in a theater of war will more often involve not national armed forces but rather coalition ones, and for this reason it has advanced the idea of creating and linking the ASU for the coalition armed forces with the American national strategic ASU, having in mind primarily the U.S. allies in the NATO bloc. The actual embodiment of this idea will make it possible according to the estimate of foreign military specialists, to effectively control multinational armed forces and, in the event of necessity, to cooperate with the tactical national ASU (from the corps and lower).

In NATO a decision was taken to coordinate work in the area of automating control processes on the level of the short- and long-term military cooperation programs. In line with this there are plans to solve the standardization problem as well as the operational, informational and technical compatibility of the ASU by working out and utilizing standard or compatible equipment and the same methods of data processing and transmission based on common-NATO requirements. The United States, in having the greatest experience in working out and using the ASU, proposed that the equipment and methods of data processing and display analogous to those used in the GOCS be employed in all the coalition control bodies.

Solving the problem of information support, including the collection, processing, storage and transmission of the required information is an indispensable condition for the efficient functioning of an interrelated complex of strategic, operational and tactical automated systems. As has been pointed out in the American press, the very idea of information support is not a new one. However its significance under present-day conditions characterized by an increased quantity of data sources (and the role of the U.S. Armed Forces, as the world's policeman, has largely contributed to this) with a simultaneous increase in the volume of information to be transmitted, the multiple levels it must pass through and the necessity of processing the information in a short period of time, has assumed particular urgency. The extensive use of automation equipment at present and the broadening of the sphere of its interrelated use down to the tactical level in the near future necessitates a solution to a whole range of problems which previously did not arise.

American military specialists feel that the modern equipment and methods for processing and transmitting data provide great opportunities for successfully solving the information support problem. But it is essential to clearly formulate and realize how the information can be collected, generalized, distributed and utilized for increasing the capabilities of man and the control bodies as a whole to take the soundest decisions. It is felt that a clear distinction must be made between what information is desirable to have and what is essential. Having determined the volume and composition of the essential information, everything possible must be undertaken so that it promptly and sufficiently fully reaches the commander and his staff under any, even the worst conditions.

The multiple stages through which the information must pass and the desire to most fully and rationally realize the capabilities of automation equipment and increase the efficiency of data handling have led to the need to formulate uniform demands on the standardizing of messages and uniform rules for compiling them so that the flow of information without a significant transformation can be transmitted to all the control elements. At present measures are being taken to determine the volume, time and periodicity for submitting information. The highest priority, according to information in the foreign press is being given to warning signals and the combat control commands for the strategic offensive and defensive forces, that is, the information requiring an immediate response from the superior command is receiving the highest preference.

As the American press has shown, information on the enemy is the most important. Military intelligence is the basic source in the forming of its flow. Military intelligence has been entrusted with the task of securing, providing centralized accounting, generalizing, analysis and issuing of data of a military-political, economic, military and other nature to the Secretary of Defense, the JCS and the secretaries of the armed services while the inferior control bodies receive information on the enemy needed for taking decisions and planning combat operations.

The American press has pointed out that in the last decade, the development of information activities by military intelligence (on the basis of automated data processing equipment) has been carried out on a level of solving agency problems and this is far from fully meeting today's needs. At present the task has been set of systematizing the flow of intelligence information for its use directly and without significant transformation in the armed forces ASU. In the aim of improving the acquisition and formulation of the needed flow of intelligence information, the command of the U.S. Armed Forces feels it essential to ensure dependable succession between the various types of intelligence in the aim of obtaining the necessary information in peacetime, during a period of increased tension and in conducting a war. There must be coordination and overall leadership over the work on a level of the Defense Department in the area of the control, communications and intelligence systems in order that the acquired intelligence information be promptly received by the appropriate control bodies and be used as the basis for decision taking.

A particular role has been assigned in the automating of control processes to *warning*. This is divided into advance (strategic) and immediate (tactical).

As has been pointed out in the American press, the CIA bears direct responsibility for advanced warning and this agency issues information on this question to the president and other high U.S. officials. At the same time, the U.S. military leadership feels that the resources available to military intelligence make it possible for it to make a significant contribution to carrying out this task.

In the aim of increasing military intelligence's capabilities in the area of strategic warning, the following is considered essential: to work out the most dependable and sound methods for analyzing, collecting and processing data from all sources; to employ, wherever possible, quantitative methods for measuring the enemy's readiness for active operations; to achieve a harmonious unity of present-day systems and methods with the future ones being developed both by the United States and its allies.

Immediate warning is provided by the network of ground radars and earth satellites of the EMEWS type and these comprise the basic equipment for detecting aerospace targets in the NORAD system.

In actively working out plans for creating and using the so-called "Rapid Deployment Forces" which would carry out police functions and defend the interests of the American monopolies in various areas of the world, the U.S. military-political leadership considers it essential to develop a modern highly mobile control system for this formation as well. As has been emphasized by the American press, at present there is only one such ASU (the 492L) which is used in the interests of the command of the rapid-response troops. The basic equipment is carried on C-130 aircraft based at McDill Air Base in Florida. However, in the estimate of foreign military specialists, the equipment carried on them is out of date and has virtually served its life while the communications equipment has a limited range and this impedes the utilization of the given system for carrying out command and control tasks in areas of the world remote from the United States. For this reason the Pentagon has proposed the idea of creating a new similar ASU which would be capable of carrying out the functions of controlling the Rapid Response Forces, in being at the same time part of the interrelated complex of ASU for the U.S. Armed Forces.

From all that has been stated above, it follows that the U.S. military political leadership has recently been carrying out active measures to implement the existing programs for ASU development as well as elaborate future ones. Here basic attention has been given to optimizing the equipment for collecting, processing and transmitting information as well as to the operational informational and technical compatibility of the armed services ASU.

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SOVIET COMMENTS ON U.S. VIEWS ABOUT COMBAT OPERATIONS IN CITIES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 27-31

[Article by Candidate of Military Sciences, Docent, Col A. Ryzhkov: "Combat Operations in Cities (from the Views of American Military Specialists)"]

[Text] The U.S. military-political leadership, having set out to further stiffen its militaristic policy, to increase the arms race and undermine the lessening of international tension, has carried out a broad range of measures to increase the combat might of the ground forces and to improve the tactics of their operations both under ordinary conditions as well as under special ones, including combat operations in cities (large population points).

The foreign press has announced that the increased population and the development of various industrial sectors since World War II have led in many nations, particularly in Western Europe, to a significant increase in the existing cities, industrial centers and large population points as well as to the formation of new ones. Along with them the military infrastructure has been changed with the construction of new facilities, highways, canals, pipelines, airports, railroads and so forth.

All of this, in the opinion of American specialists, cannot help but influence the conducting of combat operations, particularly offensive ones, in such a theater of war as the European one. According to the data of recent research, in Western Europe there has been a further growth of the cities, many of which, in merging with the suburbs, stretch for many scores of kilometers and can fall into the zone of probable troop combat operations. For example, there is the opinion that here, with within the combat zone of a brigade, there will be an average of around 25 population points with a population up to 3,000 persons each (not considering the cities and large population points in the zone of a division and which will be encountered here every 10-15 km).

As a whole, built up terrain can create problems in the advancement of troops on the battlefield, it can restrict opportunities for maneuver, impede the simultaneous use of large infantry and tank forces, restrict intelligence operations, complicate control, limit vision and firing, reduce the effectiveness of radio operations and target designation and so forth. At the same time urban structures and utilities can be turned, particularly on the defensive, into strongpoints, centers of resistance, defensive areas and so forth.

These and other particular features have underlain a number of recommendations for American troops to conduct combat operations in a city and their provisions are being tested out in the course of daily combat and operational training, in exercises and maneuvers.

As has been pointed out in the foreign press, combat in a city is the conducting of combat operations (an offensive or defensive) directly within the limits of built-up terrain.

In the opinion of American military specialists, a city (large population point) in the course of an *offensive* can either be skirted by the troops for the purpose of sealing it off or become a main objective of the attack the capturing of which means the fulfillment of the specific combat task. It has also been emphasized that an offensive involving the carrying out of tasks to seal off or capture cities will be the most typical type of combat operations for the theater of war in Western Europe. In this instance an offensive against a city can be conducted by three means: a frontal attack, an offensive from a march formation and the clearing of passageways. The aim of the first is to make the main thrust against the most vulnerable place in the defenses with the simultaneous tying down of the flanks by troops advancing outside the population point. With the second method it is recommended that the troops rapidly advance along the basic axes, capturing and reinforcing the key objectives located within the city. The method of clearing passageways should be used when the city has been well prepared for the defensive. In this instance the advancing troops should capture the basic objectives (one or two) within the city limits in order that the following waves, in utilizing the designated "passageways" (routes of advance) and lines of captured objectives, can exploit the achieved success and carry out the designated tasks of capturing the city.

As a whole, as the American experts feel, in organizing an offensive against a city, the basic principle should be the maximum utilization of weak points in the enemy defenses. It is recommended that the strongpoints if possible be skirted and sealed off and that the troops capture and retain those objectives which would provide advantages for the advancing troops in further moving through the city.

Sometimes it is considered advisable for the offensive against large population points to be made by two troop groupings. This depends upon the particular features of the city, the degree it has been prepared for the defensive and the specific conditions of the combat situation. In such an instance, the first (enveloping) grouping is assigned to capture the key positions around the city and to seal it off (encircle it) in order to cut off the routes for bringing up enemy reserves and the delivery of materiel to the population and troops defending the city as well as to prevent the retreating of the defending troops. This grouping would include the most mobile units and formations the actions of which can be supported by tactical airborne forces.

The aim of the second grouping (it makes the frontal attack) is to capture the built-up areas of the city and destroy its garrison. It is formed from motorized infantry units which include tanks, artillery, engineer and other subunits.

It is recommended that an offensive against a major population point be carried out in three stages. The task of the first is to seal off the city by capturing the key positions and regions prevailing on the approaches to it and interdicting the maneuvering by enemy reserves as well as the taking up of the jump-off positions for the offensive. The second stage consists in bringing up a portion of the advancing forces to the population point and the capturing of individual buildings or groups on its outskirts in the aim of depriving the enemy of an opportunity to observe and fire with direct laying on the approaches to the city. The third stage envisages combat within the city, that is, the successive capturing of each house, street and block.

According to the views of the U.S. command, the width of the offensive's front in a city will be somewhat narrower than in an offensive against prepared defenses under field conditions. For example, in a city the zone of advance for a division (brigade) is restricted to the city's size, while the front of advance for a battalion (battalion tactical group) is two or three blocks and even less in a solidly built-up area. It is recommended that the boundaries of the zones of advance be set along streets.

The depth of the combat mission for the advancing troops depends upon the nature of their actions, the situational conditions and the size of the population point. The foreign press has pointed out that in advancing against a population which is small in terms of area, the immediate mission of a division (brigade) is to capture it completely and reach the opposite edge or go beyond it. In an advance against a large population point, the depth of the immediate mission for a division can be limited to three or four cross-streets with the adjacent blocks or area of the city, and for a brigade, one or two streets. The immediate mission of a battalion (battalion tactical group) is to capture the objective of the advance, for example, one block, and the follow-up mission is to capture other blocks. A motorized rifle company (company tactical group) is given an immediate mission of capturing an object or several buildings at the start of the block and a follow-up mission of the last structures on its opposite side. A platoon is given only one object which is a part of the immediate mission of a company (two or three small buildings or one complete large building).

The battle formations of the subunits, units and formations are organized, as a rule, in two echelons and if the city is defended by weak forces, in one.

The particular features of an offensive against a large population point have a substantial impact upon the use of the resources as well as on the employment of the branches of troops and aviation.

In conducting combat in a city, the leading role is assigned to the motorized infantry which operates in small groups or as part of the company or battalion tactical groups, the combat operations of which can be supported by field artillery, mortars, antitank guided missile launchers, manpack or self-propelled flamethrowers and fire support helicopters. The advance of the troops will depend upon the degree of enemy resistance. In the event of stubborn resistance, the clearing of the buildings after their capture is done carefully. Otherwise the first echelon subunits move forward in pushing toward the most important objects in the city while the task of the final clearing of the enemy from the buildings is assigned to the reserves. It is recommended that underground utilities, particularly the subway, be used for penetrating the enemy positions and for attacking its strongpoints from the rear.

American military specialists feel that the massed use of tank troops will be difficult under urban conditions. For this reason it is recommended that the tanks be employed to defeat the enemy on the approaches to the city or for a flank envelopment in order to seal off the city. In the course of combat directly in the population point itself, the tanks should be attached to the infantry for providing fire support.

The foreign military press has pointed out that in the course of an offensive against a city, the control of field artillery is decentralized while the artillery itself is distributed between the attacking subunits. For example, it is considered advisable to support each company tactical group with a battery the weapons of which destroy fortified buildings, neutralize and destroy the personnel and weapons in them, make passageways through barricades and rubble as well as repel enemy counterattacks. It is recommended that the field artillery available to superior chiefs be given the mission of destroying major objects of the attack, neutralizing their enemy garrisons, artillery and mortars.

The combat engineer subunits usually operate together with the first echelon of the advancing subunits and are employed for making passageways through obstacles, mine detection, including for booby-traps, for providing help in deactivating them, for clearing away barricades, rubble and destruction and extinguishing fires.

The antiaircraft weapons should be used for covering the attacking troops against air strikes and for sealing off the beseiged city from the air. For example, the crews of the Red Eye antiaircraft missile complexes should be positioned on the roofs of dominant buildings in order to more effectively combat enemy aviation, including helicopters. The Chaparrel-Vulcan battalion of a division can be deployed on squares and in parks away from tall buildings. In the course of combat it is successively moved up behind the advancing units.

Tactical aviation is used for destroying objects both on the approaches to and within the city. With the beginning of the storming, it attacks the enemy troops and firing positions in the city, the enemy reserves, the air defense weapons, control posts and so forth. Army aviation can also be used in the interests of the advancing troops.

For ensuring dependable communications with the advancing troops, it is recommended that the ultrashort-wave radios be used and these should be located on the tall buildings and other objects.

After capturing a large population point, it is considered essential to immediately move the basic mass of troops outside of it.

The U.S. army command gives great importance to the city's *defense*. This is organized in the event when it is possible to achieve a real superiority over the enemy by **tying** down the actions of its basic troop grouping or when the city's defenses are one of the component parts of the defensive operation. It has been emphasized that this consists of an external defense and the defense of the city itself. The former is organized in the same manner as on ordinary terrain, that is, a forward defense area security zone, the basic defensive area and the rear area are created. The cover and security troops are positioned on the approach routes to the population point ahead of the basic defensive area. In the city itself, the defenses are echeloned in depth by creating defensive positions and areas (two or three in large cities and one in small ones) and here the strongpoints are prepared for all-round defense. These are interconnected by communications passages cut through the walls and are combined into centers of resistance. In each of them fire is organized in several layers. Structures impeding firing should be destroyed so as to be able to create zones of overlapping fire with the adjacent defensive areas.

It is recommended that the forward defensive edge be organized beyond the city limits in order to prevent the enemy's penetration into its suburbs and use the structures existing there for sheltering the personnel and weapons. This line should not have a precise configuration so that the enemy cannot concentrate fire against it.

The foreign military press has emphasized that a division, depending upon the size of the city, can defend either the entire city or a portion of it. In the latter instance it can be assigned a defensive zone (sector) while the brigade would be given a defensive area including several positions in depth, a battalion tactical group would have a center of resistance and a company tactical group would have a strongpoint which would include two or three blocks or major buildings.

The battle formations of the suburits, units and formations are usually organized in two echelons with two-thirds of the forces in the first and one-third in the second (the reserve). In the subunits it is recommended that the weapons be echeloned not only in depth but also in height, creating a so-called multi-layered fire system configuration. The reserves (second echelons) are positioned in areas which allow their rapid moving up to threatened areas for reinforcing the defenses or conducting counterattacks.

The foreign press has pointed out that in defending a city, each building and each block consisting of stone houses provides shelter for the defending troops and this does not always make it possible for the advancing forces to precisely determine their composition and strength in a specific sector or area.

Minefields, barricades and other obstacles are created in a city. Communications trenches are prepared for the maneuvering of small subunits while holes are made through the walls of buildings. Trenches, slit trenches, foxholes and communications trenches are dug between buildings, in courtyards, squares and parks.

All the defensive works and firing positions (basic and alternative) are created in such a manner as to have all-round viewing and firing. It is recommended that the antitank weapons be located in buildings and other shelters.

It is felt that tanks should be located in positions for firing with direct laying, covering the possible routes where attacking enemy tanks may appear.

As American military specialists propose, the field artillery weapons on the defensive should be employed in such a manner as to achieve effective neutralization of the enemy. For example, in an engagement on the approaches to a city, the basic efforts to the artillery should be focused on hitting the advancing personnel and equipment and so forth. In an engagement directly in the city, the weapons should be used in the most probable routes of advance with the task of destroying enemy tanks and other armored targets, to cut off the personnel from them, to neutralize weapons and so forth. It is also possible to employ artillery for destroying buildings and other objects in the aim of increasing the defensive capabilities of one's troops. Concentrated fire is prepared against areas of a possible enemy accumulation, and barrage fire for covering exposed areas of the defenses, squares and other most probable routes for the enemy to penetrate across areas with concealed approaches.

A division's field artillery weapons should be used in the following manner. The battalions of 155-mm self-propelled howitzers are allocated among the first echelon brigades considering one or two battalions per brigade (and one or two batteries between battalions). A battalion of 203.2-mm self-propelled howitzers is usually available to the division's commander and is employed for general support.

The combat engineer subunits should be employed for preparing buildings and shelters for the defense, for mining structures and underground utility lines, for building various obstacles and so forth as well as for taking fire prevention measures as fires can make a city unsuitable for defense.

It is recommended that antiaircraft artillery be positioned in comparatively open terrain within the city or in direct proximity to it in such a manner as to provide the required sector of fire and cover the units and subunits which are most vulnerable to air attack. The units defending the city, for the purposes of combating an airborne enemy, use basically the TOE weapons (for example, the Red Eye antiaircraft missile complexes, the antiaircraft units and missiles of the Chaparrel-Vulcan battalions).

Tactical aviation provides direct air support for the defending troops. It is employed for attacking the enemy and neutralizing targets which cannot be destroyed by artillery or by other weapons.

American military specialists feel that the basic task of army aviation on the defense should be to ferry infantry subunits and weapons to threatened areas in order to prevent the further advance of attacking troops or to recover a lost position. In individual instances it can be given the task of fire support for the defending subunits and units as well as troop control.

The foreign press has pointed out that a defensive engagement in a city is divided into the engagement for holding the approaches to the city (this is carried out on the general grounds) and the engagement in the city itself. The engagement in the city is conducted not along a solid front but rather individual important sectors (streets, alleys or squares), in being divided into a number of local battles. Great importance is given to the engagement for individual buildings and structures and within the structures for individual floors, basements, attics and stairwells.

Fire support envisages the use of mortars for firing from indirect firing positions against nearby targets since buildings in urban-type population points can restrict the effective use of large-caliber field artillery.

If the enemy should penetrate in to the basic defensive area, the efforts of the units and subunits are aimed at destroying the advancing troops. If it is impossible to eliminate the grouping which has pushed in using the first echelon reserves, then troops (the second echelon) are moved up along previously designated and prepared concealed routes to the deployment line for conducting a counterattack supported by the fire from all types of weapons. It is recommended that counterattacks in a city, in involving the storming of buildings, be carried out by small forces along convergent axes.

Judging from the information in the foreign military press, these are the views of the U.S. army command on the organization and conduct of combat operations in a city.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON U.S. FLAME-THROWER WEAPONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 35-39

[Article by Capt 1st Rank P. Mogutov: "Flame-Thrower and Incendiary Weapons of the U.S. Army"]

[Excerpts] In continuing to increase military potential and intensify the arms race, the Pentagon, in its preparations for war against the USSR and the other socialist nations, along with nuclear missile weapons is planning to use such barbarian means as flame-thrower and incendiary weapons. These weapons have already been employed by the Americans during World War II and the Korean War as well as during the period of U.S. aggression in Vietnam. According to information in the foreign press, around 40 percent of the bombs dropped on Vietnamese territory included incendiary fuels. As a total in Indochina from 1965 through 1971, the Americans consumed over 500,000 tons of napalm and dropped over 1.7 million tons of incendiary bombs (bombs, tanks and cluster bombs).

The indendiary and flame-thrower weapons, according to the views of U.S. military specialists, are designed for destroying personnel and military equipment as well as for creating fires by the effect of the flames and the high burning temperature of special substances. These weapons include incendiary substances and the means of delivering them to the target. American specialists have noted the following particular features of these weapons: the possibility of hitting large accumulations of personnel and equipment; the destruction and knocking out of large military objectives and population points for an extended period; the providing of a significant psychological effect on people (their capacity for resistance is reduced); the injuriousness of the burns and the extended in-patient treatment of the victims. They feel that the low cost, in comparison with other types of weapons, as well as the presence of a sufficient raw materials base provide substantial advantages for incendiary weapons with their mass use.

Judging from the materials in the foreign press, the U.S. army command has not lessened the attention shown to flame-thrower and incendiary weapons, it is studying the experience of its employment in recent wars and intends to use the given type of weapons of mass destruction in the future. The work presently being carried out by American specialists is basically aimed at developing more effective incendiary substances and new means of delivering them on the battlefield.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON EMPLOYMENT OF AWACS E-3A AIRCRAFT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 43-50

[Article by Doctor of Military Sciences, Prof, Col A. Krasnov: "The Combat Employment of E-3A Aircraft (from the Views of Foreign Military Specialists)"]

[Text] In recent years, in the United States and in certain other nations which are members of the aggressive imperialist NATO bloc, there has been a noticeable increase in the plans to develop systems making it possible to detect an air enemy, particularly at low altitudes, as early as possible and to control the forces of one's aviation over its territory. This is due to the fact that foreign military specialists have reached the conclusion that fighter aviation, regardless of the increased combat capabilities of its aircraft, due to the insufficient range of detecting high-speed air targets, has been unable to successfully prepare itself, to commit sufficient forces to combat and effectively realize these capabilities at maximum limits in terms of fuel supply. The combat capabilities of the antiaircraft missile complexes also cannot be fully utilized. Moreover, it is felt that with the increased dynamic nature of combat operations, the insufficient range of observing the situation evermore impedes control of the attack aviation.

Even previously the foreign press has emphasized that with the use of onboard radars it is possible to observe the entire air situation in a significantly larger space than in using ground radars as well as to detect air targets at any altitudes, including at low and maximum low ones against the background of the underlying surface. This has made it possible for the air command to continuously control the subunits located over a large territory while the pilots had been able to more effectively utilize the capabilities of their aircraft and weapons. Here significant flexibility of employment and a sufficiently high survival of the aircraft systems themselves can be achieved as these are less vulnerable to enemy nuclear missile strikes than ground ones.

Proceeding from what has been given above, foreign specialists, and primarily American ones, have begun to create airborne advance radar detection (ARD) and control systems. For this it has been necessary to develop onboard radars capable of detecting such small-sized targets as helicopters and aircraft at great distances. As has been pointed out in the foreign press, the task is complicated by the fact that the radar continuously moves along with the carrier aircraft. Because of this, the well-known method of indicating moving objects based upon determining the Doppler frequency shift is unusable, since the speed of the objects observed in relationship to the radar (depending upon the size and the position of their velocity vector in space) can vary greatly and even equal zero or be negative. However, the question was solved by creating pulse-Doppler radars with a variable pulse repetition rate.

Other problems arose, in particular in developing new methods for the rapid processing and transmitting of large flows of information. Due to this, as Western experts have emphasized, in developing the systems more attention has been paid to the capabilities of the equipment than to the technical performance of the aircraft the only requirements for which are load-carrying capacity and length of flight.

At present abroad there are several aircraft ARD and control systems (in the press they are often termed simply ARD and control aircraft). Foreign military specialists consider the American AWACS system to be one of the most advanced. Its basic element is an E-3A ARD and control aircraft. This has been developed on the basis of a Boeing 707 transport equipped with a powerful multifunction radar, equipment for processing and transmitting data as well as devices for controlling the air and antiaircraft missile subunits, including for fighter guidance.[1]

These aircraft are designed to be used in air defense interests over the North American continent and chiefly for supporting the combat operations of the U.S. tactical aviation in the overseas theaters of war and the joint NATO air forces.[2]

In justifying the commissioning of the E-3A aircraft, the commander of the U.S. Air Force TAC, Gen R. Dixon, in 1978 asserted that "radar combined with a high-speed jet platform and advanced equipment for processing and transmitting data in essence compensates for the insufficient range of existing ground radars, it provides the decision-taking commander with a good overview of the picture of battle and makes it possible to most effectively deploy the weapons and establish control over air engagements at all altitudes."

According to information in the American journal AIR FORCE, by the start of 1981, the United States had built and put into service the specialized 552d Wing of the Tactical Air Command (Tinker Air Base in Oklahoma) with more than 20 E-3A aircraft (out of the 34 ordered).

Below, using data published in the foreign press, we give the views of U.S. military specialists on certain questions related to the combat employment of the E-3A aircraft in carrying out various missions. However, it is essential to consider that individual announcements in the Western press are of a publicity or propaganda nature and do not always conform to reality.

The combat employment of the E-3A aircraft in the interests of North American air defenses has been organized together with the Sage Automated Air Defense Control

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[1] For more detail on the onboard equipment of the E-3A aircraft see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 5, 1979, pp 50-53.--Editors.

[2] For the plans to deploy these aircraft in Western Europe, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 3, 1979, pp 54-55.--Editors.

System deployed in the United States. In this instance it is envisaged that the crews of the E-3A aircraft (the crews are made up of the flight crews and a crew of combat control operators) are ready to take off at airfields located near the air defense control centers and which provide continuous observation of the air situation. In peacetime these aircraft sortie to carry out assignments with a heightening of the international situation as well as during exercises and maneuvers conducted according to the combat training plans. In wartime they should be continuously on duty in the air over the distant approaches to the U.S. coast. An aircraft can remain up to 6 hours in the patrol area some 1,600 km from the airfield (without mid-air refueling). The optimum flight altitude is approximately 9,000 m. In the opinion of American experts, this is the best for the operating of the onboard radar. Due to this maximum range and reliability of detecting and identifying air targets are achieved and in addition the best conditions are created for controlling the air defense equipment.

The capabilities of the equipment on the E-3A aircraft for detecting air targets and controlling air defense weapons, as foreign military specialists assert, are determined by the nature of the enemy attack, but chiefly by its density and the intensity of the interference used by it. The actions of their own air defense weapons which require control from the aircraft also play an essential role. It has been pointed out that in repelling massed air attacks, the equipment of the E-3A aircraft makes it possible to detect and display the coordinates of 1,500 targets and to simultaneously track over 100 of them. Here the team of combat control operators can carry out circular (360°) observation of the air situation in a radius up to 450 km and to detect and identify various air targets, including low-flying ones which remain unspottable for the ground radars. From onboard the E-3A aircraft, an air space can be surveilled the area of which is many times greater than the one surveilable by ground radars. As a result the crew has significant advantages in carrying out various control tasks, including fighter guidance and returning them after an interception to their own airfields, as well as giving target designations for the antiaircraft missile complexes. The information obtained by the onboard equipment is transmitted to other elements of the system, in particular directly to the ground air defense control points, to the interceptor fighters and to other E-3A aircraft. This information is automatically and continuously updated.

The tactical actions of the E-3A aircraft crews have been improved in numerous exercises conducted by the joint commands of the U.S. Air Force. Thus, as early as 1976, during the Vigilant Overview Exercise, they worked out the tactical procedures for locating air targets and the skills of fighter control, together with the ground radars they reconnoitered the air space, while at another Red Flag Exercise in 1978, they worked on actions under conditions of a high attack density and the mass committing of their own fighter aviation to combat. During this exercise from an E-3A aircraft, for 75 minutes, they controlled 134 fighters operating against 274 "enemy" aircraft.

During a U.S. Air Force SAC exercise in 1979, particular attention was paid to training the crews in the ability to detect air targets at maximum ranges under the conditions of intensive jamming of their radars and to control the air combat of the fighters. The radar operators observed the air situation under various operating modes of the radar: in the pulse-Doppler mode with beam scanning for elevation and without it, as well as in a pulse mode with a low signal repetition rate. The detecting of jammers was carried out in a mode of passive scanning, that is, with the transmitter off and the receiver on. In addition, for avoiding jamming they altered the radar's carrier frequency, and they employed special equipment for detecting the targets against the background of the signals from the dipole reflectors.

However, according to information in the foreign press, the radar operators of the E-3A aircraft have pointed out that such measures do not produce the desired result if the jamming is set by not one but several opposing aircraft. For this reason the crews have worked out tactical procedures for avoiding the zones of jamming set for them by reducing altitude and altering the patrol area. In the given instance, according to the opinion of American specialists, the possibility of surveilling the air situation still remains, although the range of target detection is somewhat reduced and it is not possible to fully avoid the influence of jamming.

Along with using the AWACS system in the interests of North American Air Defense, the U.S. military leadership intends to employ it also in the maritime theaters of war in the aim of increasing the effectiveness of ASW for the carrier striking groups, the ship formations and convoys. For this work is being done to improve the software for the aircraft equipment and to standardize the forms for transmitting control commands. The corresponding tactical and special training of the E-3A aircraft crews is also being carried out.

The combat employment of the E-3A aircraft (the AWACS system) in the interests of tactical aviation encompasses a broader range of activity than simply the air defense systems. In this instance the aircraft will carry out air defense tasks (detect air targets and control the air defense forces) and support the combat operations of tactical aviation when it makes strikes against various ground objectives, conducts air reconnaissance and so forth. In this regard, as American specialists have pointed out, an important aspect in the combat employment of the AWACS system is close coordination and a unification of reconnaissance functions with the command control functions. Judging from information in the Western press, the E-3A aircraft crews assigned for supporting tactical air operations are constantly ready to sortie and participate in all major exercises. Thus, in the Tactical Operations Test Exercise (it was conducted on U.S. territory but took into account the particular features of the European theater of war), these aircraft searched for "enemy" aircraft and controlled fighters without the aid of ground equipment, carrying out here more than 100 guidances under jamming conditions. They also controlled the actions of the tactical air strike groups and provided the air force and ground forces command with information on the ground and air situation in the area of combat operations.

A characteristic feature in the combat employment of the E-3A aircraft during the Red Flag and certain other exercises conducted at a later period (starting in 1979) was a further broadening of control functions for the tactical air subunits when they struck ground targets and in conducting air engagements with "enemy" aircraft. For continuous control and command in the course of these exercises, the E-3A aircraft carried out mid-air refueling and because of this the time they spent in the area of combat duty was increased up to 14 hours.

In analyzing the experience of the exercises as well as on a basis of theoretical research, American military specialists have concluded that in conducting reconnaissance of the air space and in controlling the air defense forces in the theater of war, the E-3A aircraft can form advance radar detection zones in the probable sectors of enemy air operations and the crews will carry out the same missions as in the U.S. air defense system. In a complicated air situation, provision has been made for using several aircraft cooperating both between themselves and with the ground radars and for this the appropriate communications systems have been worked out. The information obtained by them is transmitted directly to the centers of the air defense system as well as to the ground tactical air control points.

In supporting tactical aviation, from each E-3A aircraft it is possible to provide centralized control over large forces in vast areas as well as for individual aircraft subunits over enemy territory. In this instance the crews of the E-3A aircraft are to carry out the following tasks: guidance (under conditions of poor visibility) for combat aircraft not having onboard radars to the ground targets; warning of the approach of enemy aircraft and controlling the combat of the air cover fighters; providing safety for the aircraft returning after carrying out missions from being fired on by their own ground air defense weapons (the issuing of information to avoid kill zones and warning the control posts of the antiaircraft missile complexes and antiaircraft artillery). The missions of the crew can also include the detecting of various ground objects, for example, airfields, bridges, fuel and ammunition dumps, with the immediate transmitting of data to the ground control centers, as well as participating in the search and rescuing of downed aircraft and helicopter crews. In addition, they can surveil a sea situation, using a special radar operating mode.

In studying the content of such a vast range of tasks confronting the E-3A aircraft, foreign military specialists have emphasized the need for a high training level of their crews and the use of diverse tactical procedures for obtaining complete and reliable information under the conditions of active enemy countermeasures. Here they have pointed out that while the crews are many thousands of kilometers away from enemy territory in the U.S. air defense system, in supporting tactical aviation in the European theaters of war, they must operate close to it and for this reason will be within the enemy radar detection zones and can be threatened by enemy fighter attacks.

In truth, certain military experts feel that during periods of active combat operations by the sides, the operators and command of the air defense control centers of the opposing side can be so absorbed in the course of air engagements in repelling massed attacks that they will scarcely be able to isolate on the radar indicators and boards the E-3A aircraft which are behind the basic attacking forces among the large number of aircraft, particularly under jamming conditions.

This impedes their identification and interception for the antiaircraft guided missiles and fighters. To confirm their views, they refer to the experience of American air combat operations in Vietnam, where in 1972, the EC-121 radar patrol aircraft observed the air situation and left the area only after the massed strikes, and supposedly not one of them was shot down.

However, a majority of the Western European military specialists does not share this viewpoint. They feel that these expensive aircraft are primary targets for enemy fighter attacks as well as the long-range antiradar missiles which can be quickly developed for combating the E-3A type aircraft. Proceeding from this, to ensure the safety of the E-3A aircraft, they have begun to install electronic countermeasure equipment on them, including: receivers which detect a radar beam, jammers and devices for dropping dipole reflectors. At the same time ways are being sought for effectively using the ECM equipment to confuse the enemy and tactical procedures for avoiding enemy fighter attacks. In addition, provision has been made to assign cover aircraft (in studying this question the recent F-15 American fighters have most often been viewed as such in the Western press).

In the opinion of foreign military specialists, under the conditions of active enemy countermeasures, the E-3A aircraft should carry out combat missions over their own territory beyond the kill zones of their own antiaircraft missiles and under the protection of their own air defenses. In this instance, in order to hit the E-3A aircraft, the opposing side's fighters must initially break through the fire curtain of antiaircraft guided missiles and antiaircraft artillery and then through the cover of fighters (F-15). If they do break through the zone of the ground air defenses, engage the F-15 fighters in combat and threaten to attack, it is recommended that the crews of the E-3A aircraft set up jamming to confuse the enemy ground radars and execute an energetic defensive maneuver for the purpose of escaping from the detection zone while smultaneously preventing an attack by fighters armed with radar and infrared homing missiles by dropping dipole reflectors and infrared decoys. This maneuver is executed deep in home territory with a reduction in altitude and the simultaneous shutting down of all emission sources on the aircraft (one of the versions of actions by an E-3A aircraft and its cover forces is shown in Fig. 2 [not reproduced]).

At present, in continuing to develop the methods of the combat employment of the E-3A aircraft, the Pentagon is widely employing them to carry out espionage missions in various, so-called "vitally important" regions of the world for the United States. In particular, since the autumn of 1980, crews of the E-3A aircraft have regularly conducted reconnaissance flights from Kadena Air Base in Japan.

During the same year, with the outbreak of the Iraqi-Iranian conflict, a group of E-3A aircraft was shifted to the Persian Gulf area. In making flights from Arabian territory, they followed the course of the air combat of the opposing sides and, according to information of the UPI Agency, in the event of armed U.S. intervention into this conflict, were ready to assume the functions of airborne command posts in order to control the flights of their ground attack planes and fighters from the Rapid Deployment Forces in carrying out various combat missions.

In addition, since the end of 1980, E-3A aircraft have been stationed at Ramstein Air Base in the FRG. These make regular flights to conduct reconnaissance in the air space and over the territories of the socialist countries.

The E-3A aircraft and NATO. Under the pressure of the U.S. militaristic circles, their Western European partners in NATO took a decision to deploy an airborne ARD and control system within the joint armed forces of this aggressive bloc. A decision was taken to purchase 18 E-3A aircraft (the first of them was built by the American Boeing Company and at the beginning of 1981 was ferried from the United States to the FRG for further equipping and testing).

The foreign press has pointed out that the given aircraft should carry out three basic missions: reconnaissance and warning of troops in the air defense system, control of tactical aviation and the air defense resources. With their aid the command of the NATO Joint Armed Forces plans in peacetime to observe the air space over the territory of the socialist countries, to conduct electronic reconnaissance and follow the moves and daily activities of the air units of the Warsaw Pact countries.

Prior to the start and in the course of combat operations, in the opinion of the NATO strategists, the E-3A aircraft, together with the ground radars, will create a solid advance radar detection zone. Here their crews will follow the air situation on the boundaries of the ground radar scan areas and the areas not scanned by them and with the failure of the radars, as well as detect low flying targets at great ranges. The air defense weapons are to be controlled from ground posts and with the failure of the latter from the E-3A aircraft. In addition, the bloc's military leadership intends to use the E-3A crews in the Atlantic Ocean for protecting the sea lines of communications over which troops and military equipment will be ferried from the United States to Western Europe.

However, the military experts of the Western European countries which are to use these aircraft feel that they also have certain shortcomings. For example, in analyzing the results of test flights for the E-3A aircraft from Rahmstein Air Base it was discovered that its onboard radar was not sufficiently effective for detecting small aircraft at low altitudes and for identifying ground targets, the number of simultaneously tracked air targets was insufficient in repelling massed enemy air attacks and in being incorporated in the system of the English Nimrod-AEW.3 ARD and control aircraft, the problem arose of their joint use, as the crews of the latter were unable to receive information from the E-3A.

In addition, certain specialists feel that the aircraft's radar and lines for transmitting data to the consumers are little protected against jamming. They have also pointed to serious shortcomings in the training of the E-3A aircraft operators for working in a general control system, particularly in a difficult air situation.

For broadening the capabilities of the AWACS system, it has been proposed that modernized radars and computers be installed on the E-3A with an increase of severalfold in the speed and capacity of the storage units. In addition, they are to be outfitted with radar reconnaissance and ECM equipment, jam-proof communications and armed with air-to-air guided missiles and antiradar missiles. As the foreign press has announced, in the long run they plan to organize data transmission from the E-3A aircraft not only to the air defense and tactical air control centers but also directly to the command posts of the ground forces, to SAM control posts, combat aircraft and helicopters as well as to ships. In this regard the NATO nations have begun preparing for the appropriate modernization of the Nage System and for training the crews of the ground radars and control centers for cooperating with the crews of the E-3A aircraft as well as installing additional equipment on the interceptor fighters for communications with them.

As the foreign press has emphasized, from all that has been said it follows that the military leadership of the NATO bloc with the aid of the E-3A aircraft plans to significantly increase the effectiveness of the control systems for aviation, air defenses and the armed forces as a whole.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON EMPLOYMENT OF THE C-5A AIRCRAFT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 55-57

[Article by Col V. Berdov: "The Operation of C-5A Aircraft from Dirt Fields"]

[Text] As the foreign press has announced, at the end of 1980, at the U.S. Air Force Flight Testing Center at Kirkland Air Base in New Mexico, research was completed on determining the possibility of operating the C-5A Galaxy heavy military transports from dirt runways. The necessity of this work, according to statements by specialists from the U.S. Defense Department, was due chiefly to the development of the new CX military transport which was to be used in the European theater of war, the Near East and in other regions of the world. One of the basic demands made by the Pentagon on the new aircraft was the possibility of operating it from dirt runways. They feel that the prototype of the new aircraft will probably be either the C-5A or one of the test models of the short take-off and landing military transports developed under the AMST program.

During the first stage of the research, 11 hard-surfaced airfields were studied on FRG territory and 10 of them were air bases (3 of the U.S. Air Force, 3 of the American Army Aviation and 4 of the FRG Air Force) and 1 a civil airport. Here the experts concluded that 7 airfields could not be used by the C-5A aircraft for various reasons (insufficient strength of the surface and width of the runway, the lack of the necessary areas for servicing, the proximity of structures impeding maneuvering on the ground and so forth), while the remaining 4 could receive, unload and service only one aircraft under the condition that it remained on the runway after landing.

In addition, according to their calculations, for the normal operation of the C-5A heavy military transports, the width of the taxiways should be at least 15 m, the radius of curvature should be 21 m and sharp changes in the runway directions should be rounded.

Considering the minimum taxiway width (15 m), of the 11 studied airfields, only 4 were suitable on a limited basis under the condition of removing obstacles impeding taxiing from the taxiways and from 3 of them intensive flights by the C-5A aircraft could be carried out. At another 4 for normal operation of the C-5A and similar aircraft it was necessary to eliminate certain structures, and 3 could be used only in operating on dirt. As a whole, in the opinion of the specialists who conducted the testing, in order to broaden the transporting of troops and cargo (on heavy aircraft), at all the 11 airfields it was essential to utilize the unsurfaced areas adjacent to the runway but for this it was essential to precisely determine the strength of the ground and have a good knowledge of aircraft capabilities in operating them from dirt airfields.

For conducting the experiment on U.S. territory, three air bases were chosen having various types of ground. Thus, at Shaw Air Base in South Carolina, it is a mixture of loams and sandy silt, at Althus Air Base in Oklahoma it is loamy-sandy silt and at Elgin Air Base in Florida, littoral sea sand.

Five aircraft weights were chosen for the testing (from 193 to 300 tons). Maneuvering on the ground was carried out with different turning angles for the nose wheel and with different clearances. The aircraft was taxied from the hard runway onto the ground, unloaded and then returned to the runway. Speed over the ground was not more than 18.5 km per hour. The experiments were also carried out by towing the aircraft across the ground (here its weight did not exceed 193 tons).

Two criteria were established for conducting the testing. The first determined the maximum acceptable engine power in taxiing (not more than 95 percent of the maximum). The second provided that the quality of the ground after several taxiings over the same area should remain constant. In the opinion of specialists from the research group, the testing of possible use of the C-5A on weak ground was ill-advised as the preparation of the ground for receiving the heavy aircraft required an enormous amount of strengthening additives (for example, limestone, cement, crushed rock or gravel), significant labor outlays and work mechanization.

As was pointed out above, the experiment used three air bases located on U.S. territory. At two of them, as a consequence of operating the aircraft on the dirt, the grass cover was destroyed, its upper layer was pulverized and the lower layer compacted. However, after this taxiing was done without significant complications. At Elgin Air Base, the depth of the track was 20 cm and the displacement of the layers up to 15 cm (with four or five taxiings over the same area). At the same time, the mechanical properties of the ground were significantly reduced and the cohesiveness of the layers disappeared, but it was still possible to operate the C-5A in the opinion of the American specialists, although in taxiing it was constantly necessary to remove in front of the nose wheel the clumps of sod and hills of sand formed by the movement of the previous aircraft.

In towing the aircraft, as the Western press has pointed out, it was discovered that not all tractors operate well on various types of ground. Moreover, the towing attachments also had to be modernized as movement across the ground was less even than over concrete (the crossing of tracks, pulling onto the runway and driving off it). This led to the riding over of the tractor units and to the damaging of the aircraft tires and wheels.

In the opinion of the pilots participating in the experiment, taxiing over the ground did not present any particular difficulty. However the specialists feel that while there is no need for additional crew training for such taxiing, it is essential to work out certain recommendations, in particular, on using the extendable stairway in a lowered position for entering the cockpit, for choosing the engine operating modes in taxiing over various types of ground and in turns and also for redistributing the duties of the crew members.

In conducting the research, American specialists concluded that in the event that the C-5A aircraft landed on airfields with narrow runways and with the impossibility of using their dirt taxiways and parking areas (mud, unsuitable ground and so forth), the width of the artificial runway should be at least 27 m. With the absence of special unloading areas next to the runway, the cargo should be removed from the aircraft at the end of the runway after the aircraft has completed its landing run. For turning the aircraft around 180 degrees in order to taxi back to the start of the take-off, it is essential to have an area of 48 × 51 m as a minimum, including the adjacent sector of the runway (in this instance the width of the spare room for turning will be just 1.5 m). In the testing, using coverings from aluminum panels, an area was created 70 × 70 m. The taxiing and turn-arounds were carried out on this After several turn-arounds it turned out that such a surface could be used further, however several fixing elements (anchors) had pulled out from the ground around the perimeter.

As a total in the course of the experiment, 95 turn-arounds were carried out, the clearance was changed 73 times and the main undercarriage legs were lined up more than 300 times. Some 22 types of repairs were carried out. Basically the wheel hydraulic systems were repaired and the tires and wheels changed. Here the American press has emphasized that under combat conditions it will be difficult to carry out such jobs. During the testing the specialists also noted certain shortcomings in the braking hydraulic system and the wheel air pressurizing system.

Although the research was conducted purportedly for the future CX heavy military transport, from the results U.S. Air Force experts have worked out recommendations for the operation of the C-5A on dirt airfields. In accord with them, prior to operating this aircraft from dirt airfields, the following is recommended: to determine the bearing capacity of the ground to a depth of 60 cm, to study without fail the type of ground and its characteristics; to use the available forecasting equipment to establish the acceptable number of taxiings by this aircraft on the given ground; to become familiar with the weather forecast and to determine the condition of the ground under various meteorological conditions and its suitability for taxiing, take-off and landing.

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SOVIET COMMENTS ON NEW U.S. ANTITANK MISSILES AND ROCKETS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 57-58

[Article by Engr-Col V. Dmitriyev: "The Hypersonic Antitank Missile"]

[Text] In recent years, judging from information in the foreign press, the United States has intensified work on the development of a new antitank weapon which differs from the present models in higher combat effectiveness and universality of employment. American specialists consider the small-sized hypersonic missile which is under development to be one of the promising antitank weapons. In this missile the role of the warhead is played by a conical headpiece made from high-strength materials with a high specific weight (in particular, tungsten carbide) and the armor penetration is achieved exclusively by the high kinetic energy developed at hypersonic speeds (up to $M = 4-5$).

The missile (Fig. 1 [Figures not reproduced in this article]) is made in guided and unguided versions and will be employed from air, ground and ship launchers (in the latter version chiefly from aircraft). According to the calculations of the developers, the missile (around 1 m long and a body diameter of 5 cm) equipped with a solid fuel engine can at the final leg of the projectory develop a maximum velocity of 1,400-1,500 m per second and penetrate armor over 100 mm thick with a target impact angle up to 60°.

In the unguided version, the missile has fixed tail fins which provide stabilization in flight by rotating at a frequency of 100 rps. It is started up in the launching tube. Here, as the Western press has stated, since the diameter of the tail fins somewhat exceeds the diameter of the missile's body, for ensuring normal exiting from the launch tube, a composite sabot is fastened to the head and after the missile has been launched from the tube this is separated from the body by the free-stream flow.

The guided version employs tail fins which open in flight (stabilization in flight, as in the unguided missile, is provided by rotation), while in the missile's head, directly behind the tip, are located the guidance and command processing equipment. The former include microelement photoreceivers, a bank sensor and a microprocessor with its own synchronous generator. Among the latter are two small solid-fuel pulse-operating vernier engines. These are fired upon commands generated by the guidance equipment and create a thrust of about 80 km perpendicular to the flight trajectory for less than 5 milliseconds. Such repeated firing of the engines over the entire missile's flight provides the necessary correction of its trajectory for being guided to the target.

Sensitive elements of the photoreceivers are located in the missile's tail and are connected with the remaining guidance equipment through a fiber optics cable. The photoreceivers receive the coded guidance commands which are generated by a laser system located on the carrier aircraft. The received commands together with the metering data obtained from the bank sensor are fed into the microprocessor, the synchronous generator of which is turned on in launching (in this instance there is the synchronizing of its work and the guidance commands). The microprocessor calculates the missile's current position for bank and the necessary moments of activating the vernier engines.

For the launching and guidance of the guided missiles, an aircraft suspended container system has been developed consisting of a launcher with launching tubes for 20-50 missiles and a detection and guidance laser (which has been named a lidar) (Fig. 2). The lidar uses a carbon dioxide laser which has an emissive power of 50 watts with a wave length of 10.6 micrometers and an electronic deflector. This deflects the laser beam according to an arbitrary or periodic law and, as American specialists have asserted, with a much higher speed than deflection occurs in the radiation pattern of phased antenna arrays of modern radars. Due to this, in their opinion, the lidar in comparison with the existing and future air infrared forward viewing radars, will make it possible to increase the probability of detecting ground targets from 0.5 to 0.8 at a range of 2.5 km. At the same time the foreign press has pointed out that the lidar virtually loses its effectiveness in being operated under foggy conditions.

As the foreign press has stated, the lidar solves two basic problems: detecting and isolating ground targets and the guiding of 1-3 hypersonic guided missiles to each of them. In this instance guidance commands with a frequency of approximately 10 hertz will be transmitted to the missiles by a coded laser beam. The synchronizing of the commands and the operation of the synchronous generator will make it possible to employ the method of the time spacing of commands generated for the various guided missiles which are in flight at the given moment. American experts feel that a lidar can simultaneously guide missiles to 10 ground targets (at a range of 4-5 km). The missiles will be launched from the carrier aircraft at an altitude of 100-150 m.

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SOVIET COMMENTS ON NATO NAVAL COMMAND IN THE ENGLISH CHANNEL

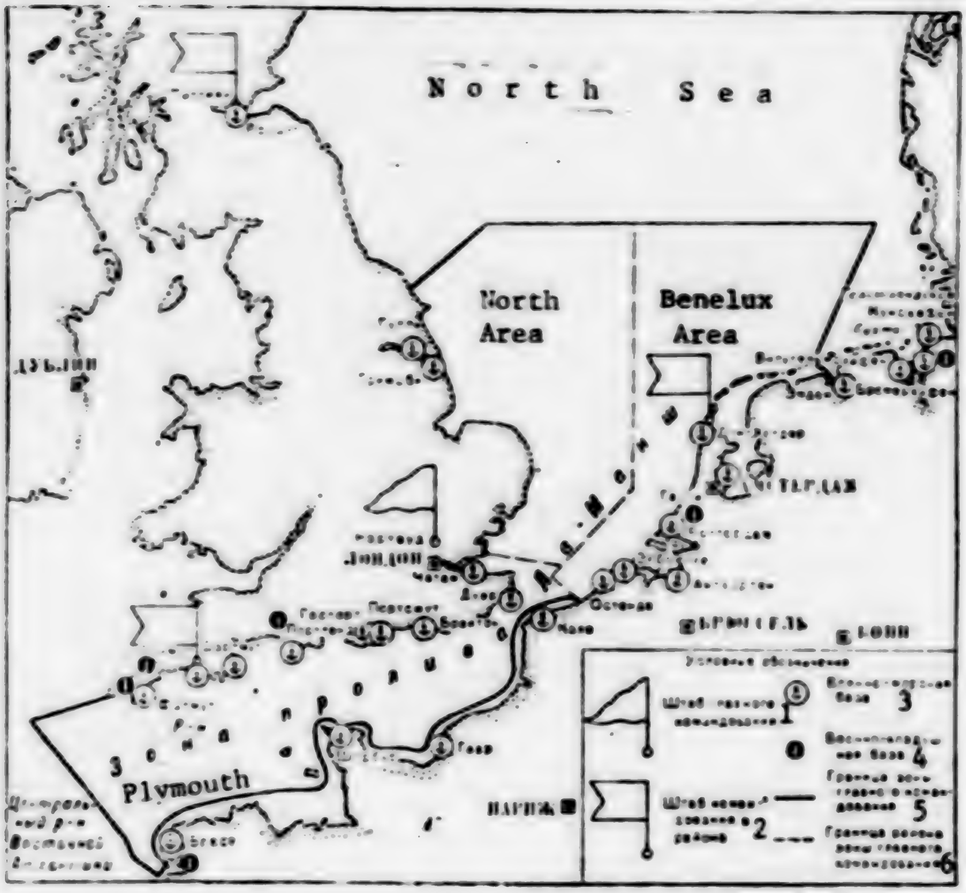
Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 6, Jun 81 (signed to press 12 Jun 81) pp 59-64

[Article by Capt 2d Rank A. Frolov: "The NATO High Command in the English Channel Zone"]

[Text] The high command of the joint NATO armed forces in the English Channel zone, created on 21 February 1952, was the third independent command of the aggressive North Atlantic bloc (after the supreme NATO commands in Europe and the Atlantic). The zone of this command includes the English Channel, the Pas de Calais and the southern part of the North Sea, with the exception of Helgoland Bay which is considered as part of the FRG coastal waters and is included according to the bloc's apportionment in the Central European Theater of War (see the diagram). The English Channel zone is divided into three areas (North, Plymouth and Benilux) where the corresponding commands have been set up.

The strategic importance of the English Channel zone is determined by its geographic position. It is located between the two basic NATO military commands and is the connecting link between the sea (Atlantic) and land (European) theaters of war. In addition, the ocean and sea lines of communication running from the Atlantic, the Mediterranean and North Sea to the ports of Northwestern Europe converge in this region of the world. Here also are located major naval bases, ports and other important military and industrial installations of the Western European states comprising the bloc. The most important types of raw materials essential for the economy of these states are transported along the lines of communications in the straits zone. Each day around 4,000 ocean-going and coastal vessels pass through the zone or are in its ports. In these shipments a special place is held by oil and oil products which comprise one-third of the total cargo turnover of the member nations.

As has been stated in the foreign press, the military-political leadership of the North Atlantic Alliance feels that under the conditions of a heightening of international attention and with the outbreak of war, for supporting combat operations in the European theater it will need to ferry more than 1.5 million men from the United States and Canada in addition to a significant amount of weapons, military equipment, various supplies and food. Here it is emphasized that the basic portion of the reinforcements will be delivered through the English Channel zone.



Areas of the NATO High Command in the English Channel Zone

Key: 1--Headquarters of high command; 2--Headquarters of area command;
3--Naval base; 4--Naval air base; 5--Boundary of high command zone;
6--Boundary of area of high command zone

The NATO Joint Armed Forces [JAF] in the English Channel zone consist of the joint navies, permanent mine-sweeping formation and the joint land-based aviation. They are headed by a commander-in-chief who is directly under the NATO military committee. Under the commander-in-chief are: the commanders of the joint navies in the areas, the commander of the permanent mine-sweeping formation, the commander of the joint shore-based aviation in the zone (he is also the deputy commander-in-chief for aviation) and the commanders of the joint shore-based aviation in the North and Plymouth areas. Within the commands is also a consultative committee the membership of which includes the chiefs of the naval staffs or representatives of the countries which have put their armed forces at its disposal.

In peacetime, the commander-in-chief (he is an English admiral who also combines the post of commander-in-chief of the NATO JAF in the Eastern Atlantic) with his staff works out the operational plans and allocates the forces to be put at his disposal, he informs the superior NATO military bodies of his operational needs, he directs exercises and maneuvers and determines the training standards. In wartime he directs the NATO JAF in the English Channel zone and coordinates the combat operations of the navies and shore-based aviation in its individual areas.

The headquarters of the NATO JAF in the English Channel zone includes representatives of all the armed services (predominantly naval officers) of Great Britain, the Netherlands and Belgium. It is headed by a Dutch admiral and his deputy is a Belgian officer. At the headquarters are also liaison officers from the French Navy.

The headquarters of the command in peacetime is combined with the headquarters of the high command of the NATO JAF in the Eastern Atlantic. With an exacerbation of the international situation, these are separated and are filled out with officers from the English naval staff, the reserve and air transport command, by reserve officers from the U.S. Navy as well as reservists from the other NATO countries and they operate independently.

At present the command does not possess troops with the exception of the permanent NATO mine-sweeping formation in the English Channel zone. However, in the event of increased tension and the starting of a war as well as during the period of conducting NATO JAF exercises, Great Britain, Belgium and the Netherlands make available to it the previously planned contingents of armed forces (from the navy and air forces). Until France withdrew from the military organization of the bloc (in 1966), there were also plans to include a unit of French naval ships and aircraft in the NATO high command in the English Channel zone. The bloc's leadership felt, as was pointed out in the foreign press, that in the event of war France should turn over a portion of its armed forces to NATO operational subordination, including to the high command in the English Channel zone. At present the French Navy takes an active part in the exercises conducted under its leadership.

Judging from information in the foreign press, in wartime the NATO JAF in the English Channel zone will be given the following missions: winning and maintaining air and sea supremacy, establishing control over navigation and defending the sea lines of communications, combating enemy submarines and attack groupings of surface vessels, eliminating the danger of mines as well as supporting amphibious landing operations and providing fire support to ground forces in the maritime sectors. Here it is envisaged that the NATO JAF in the straits zone will cooperate closely with the European and Atlantic commands in organizing antiaircraft and antisub defenses of the straits zone.

For carrying out the listed missions, according to the estimate of Western military specialists, up to 100 fighting ships, launches and auxiliary vessels should be assigned and more than 60 aircraft and helicopters from the shore-based patrol (reconnaissance) and tactical aviation made up from the armed forces of member nations the territories of which are directly adjacent to the English Channel.

The use of navies and air forces in this zone following national plans is to be closely coordinated with the operations of the JAF. A permanent formation of the NATO navy in the Atlantic can be sent to reinforce the JAF in the English Channel zone and when necessary also other forces from the NATO JAF in the Atlantic.

The joint naval forces in the English Channel zone, with the outbreak of a war, are to include fighting ships, launches and auxiliary vessels from the navies of Great Britain, the Netherlands and Belgium. The assigned ships are to be put under operational subordination of the commanders of the joint navies in the North, Plymouth and Benilux areas.

The positions of the commanders of the joint navies in the North and Plymouth areas are to be held, respectively, by the commanders of the Scottish (headquarters in Pitreavie) and Plymouth (Plymouth) naval areas of the Royal Navy. The joint navies in the Benilux area (headquarters in Den Helder) are to be led by the commander-in-chief of the Dutch Navy.

In peacetime, the staffs of the regional commands work out plans for the employment of the joint navies in their areas, they coordinate them with the national and cooperating commands and submit proposals on conducting combat operations to the commander-in-chief of the NATO JAF in the English Channel zone. In addition, the staffs plan combat training and organize exercises for the diverse forces in their areas.

The allocation of forces for wartime between the commands in the areas is planned ahead of time, however depending upon the developing situation and the tasks to be carried out, a portion of the forces can be used for carrying out tasks in adjacent areas. As was pointed out in the foreign press, submarines, ASW, landing and minesweeping vessels can be assigned to the commands of the joint navies in the areas.

The submarines are to be used jointly with surface vessels for defending the sea lines of communications and combating enemy surface and submarine forces. The southern part of the North Sea and the western approaches to the straits zone would be the basic areas for their combat deployment. However, in the opinion of foreign military specialists, the use of submarines will be restricted due to the shallow depths.

The ASW ships comprise the basis of the joint navies in the areas. They are to be entrusted with the tasks of combating the enemy submarines and surface vessels, escorting sea convoys and when necessary, supporting amphibious landing operations and providing fire support to ground forces in conducting combat operations in the coastal sectors.

The Western press has pointed out that with an outbreak of war, the enemy will turn its submarines in the areas of intensive navigation on the Atlantic and the English Channel zone so as to prevent the transporting of reinforcements and supplies by sea. For combating the enemy subs, the NATO command plans to create diverse search-and-attack ship groups. These groups will include English, Dutch and Belgian ASW ships. The search for and destruction of the submarines will be carried out by them in cooperation with shore-based patrol aircraft.

In carrying out the ASW missions, an important role has been assigned to ship-based helicopters which can detect and destroy subs both independently as well as upon guidance from a surface vessel. For this purpose the national naval commands of Great Britain, the Netherlands and Belgium are taking measures to outfit the ships with modern helicopters. In addition, the command of the Royal Navy is assigning a carrier ship for the K08 Engadine helicopters to be put under the NATO command in the English Channel zone.

With the outbreak of war, as the foreign press has pointed out, a daily task for the ASW vessels will be the defense of the sea lines of communications. It is felt that in approaching the zone the large ocean convoys arriving from the Atlantic will be forced to split up in small convoys and even individual vessels. The escorting of such convoys to their destination ports is to be entrusted to the ASW and mine-sweeping vessels.

The landing vessels are to be used for transporting reinforcements and military equipment from the metropolitan area to the various areas of Northwest Europe including on an empty coast.

The mine-sweepers, in the views of the bloc's command, will carry out the tasks of combating mine dangers and ensuring mine defense for the ships and vessels in crossings. It is considered that the shallow depths and limited channels for the navigation of large-tonnage vessels can be used by the enemy for laying mines. The minefields in areas of intensive navigation, in being set out covertly by submarines surface vessels and aircraft under conditions of a sharp intensification of international tension, can substantially influence the maritime shipments of the NATO member nations. For this reason, great significance is given to the question of developing the mine-sweeping forces. The bloc's command in the course of the conducted exercises and combat training has studied and elaborated the most acceptable and rational forms for organizing these forces. One of them, in its opinion, is the creation of a permanent mine-sweeping force.

The permanent NATO mine-sweeping force in the English Channel zone is the second multinational naval formation of the bloc. It was created upon a decision of the NATO Military Planning Committee in May 1973. Since then each year the change of command and a ceremony of forming the force have been conducted during the summer months in one of the zone's naval bases. An officer with the rank of captain 2d rank from the Belgian, British or Dutch navies rotates as the force's commander.

Belgian, English, Dutch as well as West German and Danish minesweepers have been assigned to the force. These, as a rule, are modern and most battleworthy ships the crews of which judging from information in the foreign press, have a rather high level of sea skills and have mastered the weapons and equipment well. In addition, there are provisions to periodically include American minesweepers in it. Each ship every 6-12 months is replaced by another one of the same nationality.

Overall leadership over the permanent mine-sweeping force is provided by the commander-in-chief of the NATO JAF in the English Channel zone. In conducting combat training and exercises, the force's commander in operational terms is also under the commander of the joint navies in the corresponding area (North, Plymouth or Benilux).

The daily task of the force is to increase the level of combat readiness of the mine-sweeping forces. This is achieved by systematic combat training of the ships and by participation in exercises jointly with the national navies as well as in the major maneuvers of the bloc's JAF such as "Team Work," "Ocean Safari," "Joint

Maritime Cross," "Norminex" and others. In the course of the exercises, the personnel train in using various types of weapons, they learn the navigation areas in the coastal waters of Western Europe and in the Baltic Straits and improve their sea skills. In the opinion of foreign military specialists, it is useful to have an exchange of combat crews for becoming acquainted with the mine-sweeping weapons and equipment and the organization of service, as well as participation in practice minelaying and sweeping on the ships of other nationality. During a year the force travels approximately 15,000-20,000 miles. Up to 15 ships and more than 1,200 men are involved in its training.

Judging from information in the foreign press, during a period of increased international tension, the force can be significantly reinforced by minesweepers and other ships from the bloc's navies in the English Channel zone and a larger multinational minesweeping force organized on its basis. It is to be entrusted with the tasks of combating the danger of mines and defending the sea lines of communications in this zone and when necessary also in other regions of the Western European coast.

The joint shore-based aviation is organized during a period of increased international tension and with the outbreak of war. This command is to include chiefly the English Nimrod patrol aircraft, the Vulcan reconnaissance aircraft, the Buccaneer bombers, the shore-based Sea King, Wessex and Lynx helicopters as well as the shore-based Atlantic patrol aircraft of the Dutch Navy.

The commander of the 18th Air Group of the Royal Air Force (headquartered in Northwood) is also the commander of the joint shore-based aviation in the English Channel zone. Under him are the commanders of the joint shore-based aviation in the North (Pitreavie, Scotland) and Plymouth (Plymouth) areas, the positions of which are also held by English officers. In the Benilux area there is no command of the joint shore-based aviation since the Dutch shore-based patrol aviation in organizational terms is part of the nation's navy.

In peacetime, the headquarters of the commander of the joint shore-based aviation works out plans for using the aviation in sea operations in the English Channel zone and coordinates these with the commands of the joint navies as well as with the corresponding NATO commands in the Atlantic and in Europe. In addition, during the period of conducting exercises, he directly leads air operations and through the commanders in the areas organizes its cooperation with the joint navies as well as with the forces of the joint NATO ASW system in Europe.

The questions of utilizing the joint shore-based aviation in sea operations during the initial period of a war are regularly worked on in the course of combat training and in the major exercises of the NATO JAF such as "Vintex," "Team Work," "Ocean Safari" and others. In the course of them the airplane and helicopter crews improve the tactics of searching for and detecting "enemy" submarines and surface vessels and work out the questions of utilizing the airplane and helicopter detection systems in cooperation with the ASW equipment on the surface vessels.

In the estimate of foreign military specialists, the NATO high command in the English Channel zone holds an important place in the system of the NATO JAF. It has a flexible organizational structure which has been worked out in peacetime and makes it possible to rapidly assign forces from the national commands, to form forces of the joint navies and shore-based aviation on the basis of these and use them with an increase in international tension and in various types of armed conflicts.

At the same time, the structure of the command, they propose, is rather complicated for such a small-sized geographic area. This is explained by the desire of the military leadership in the mentioned nations to maintain the existing national organizational forms in NATO as well as by their different opinions over the question of reconciling national and general allied interests in using the armed forces.

The English Channel zone is considered favorable for NATO (here there is an extensive network of naval bases, supply points and airfields) while its advantageous geographic position and the presence of shallow depths impede, in the opinion of military specialists, the operations of enemy subs. This will make it possible for the bloc's command to utilize its ASW forces more rationally. At the same time, the narrow natural and artificially created channels and passages can become areas of concealed minelaying. For this reason the organization of dependable antimine defense is one of the most important and complex tasks for the command. As for the zone's air defenses, in the opinion of the bloc's specialists, it has been sufficiently developed.

Considering these particular features, the NATO High Command in the English Channel zone has worked out and tested in the course of exercises various tactical procedures for countering the mine danger and has also worked out an organization for coordination of the naval air defenses with the forces of the joint NATO air defense system in Europe.

The Western press has announced that in recent years, the bloc's nations directly interested in the zone have increased the construction of new ships, airplanes and helicopters and are equipping them with modern weapons systems in the aim of increasing the combat capabilities of the NATO JAF in the English Channel zone. The staffs of the commands are working out new principles for employing the navy and aviation in the zone, they are constantly improving their organization and intensely conducting operational and combat training.

All these measures show that the NATO military-political leadership, contrary to the interests of the European peoples, are continuing a policy of undermining international detente and are increasing tension in this region of the world, preparing the bloc's armed forces to carry out aggressive plans.

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SOVIET COMMENTS ON ENGLISH BALLISTIC MISSILE SUBMARINE DEVELOPMENT

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[Article by Capt 2d Rank G. Perov: "Development Prospects of English Nuclear Ballistic Missile Submarines"]

[Text] In endeavoring to recover its former imperial greatness and in claiming a role of a leading power in the world, the British ruling imperialist circles are carrying out a policy of undermining detente, they are accelerating the arms race and are intensely increasing military might, primarily nuclear missile.

Nuclear missile submarines as well as the Vulcan strategic bombers comprise the basis of the British strategic forces. According to data in "Jane's Fighting Ships," the Royal Navy has four nuclear missile submarines of the "Resolution" class (S22 "Resolution," S23 "Repulse," S26 "Renown" and S27 "Revenge"). These were built in the national shipyards and turned over to the navy in 1967-1969. The surface displacement of each is 7,500 tons and submerged displacement is 8,400 tons; the length is 129.5 m, the beam 10.1 m and the draft 9.1 m; maximum surface speed is 20 knots and submerged speed 25 knots; weapons include 16 launching silos for the Polaris-A3 ballistic missiles (range up to 4,600 km) and six 533-mm torpedo tubes. The crew is 143 men, including 13 officers. In accord with the design specifications for the vessel, a 20-year service life was set for it. However at present it is considered possible to extend this to 25 years.

As has been announced in the foreign press, the Polaris-A3 missiles used on the nuclear subs were purchased in the United States,* but their warhead (of a multiple type with three warheads of 200 kilotons each) was manufactured in Great Britain. In the opinion of English military specialists, the given warhead is already obsolete and does not provide effective penetration of the antimissile defenses. For this reason at the beginning of the 1970's, Great Britain began to carry out the "Chevaline Program" the basic aim of which was to develop a new warhead of the MIRV type.

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* According to the data in the foreign press, Great Britain has purchased more than 100 Polaris-A3 ballistic missiles, and in addition, concluded an agreement for the delivery of another 31 in the 1980's.--Editors.

This program, as was pointed out in the book "Great Britain and Nuclear Weapons" by the leader of the Political Research Department of the Royal Institute of International Relations, L. Friedman, is a continuation and further development of the American Antilope Program proposed in the first half of the 1960's as one of the possible variations for improving the U.S. sea-based nuclear missile forces and was later replaced by the Poseidon Program. Its basic provisions were used in developing the new warhead which was worked out by scientists from the English Aldermaston Nuclear Center in close cooperation with American specialists. Here, as has been emphasized in the Western press, the problem of crossing antimissile defenses was solved by both increasing the number of reentry vehicles (up to six, each with a power of 40 kilotons) as well as by maneuvering the warhead along the course and by changing the rate of descent, by the earlier separation of the reentry vehicles (outside the detection zone for the antimissile defenses), by utilizing dummy targets with physical and dynamic characteristics identical to the nuclear reentry vehicles as well as by increasing the protection of the electronic equipment against the effect of the injurious factors of a nuclear explosion. The testing of the developed warhead and missile was conducted completely in the United States. Thus, according to information in the foreign press, for assessing the effectiveness of the warhead, at the Nuclear Weapons Testing Grounds in Nevada, at least five nuclear charges were detonated with a power of 20-150 kilotons each. Practice missile launches were carried out at the Eastern Missile Range. Initially the launches were made with ground launchers and in November 1980, using the reequipped nuclear submarine "Renown" in a submerged position.

As the foreign press has announced, in the event of the successful conclusion of the testing, the command of the Royal Navy intends to arm all its nuclear missile submarines with the modernized Polaris-A3 missiles. According to its calculations, the equipping of the Polaris-A3 with the new warhead will not necessitate a significant modernization of either the missile itself or its onboard fire control system.

In the opinion of the British military-political leadership, the implementation of the "Chevaline Program" will significantly increase the strike power of the naval strategic forces, as just one modernized Polaris-A3 missile is capable of hitting several targets over an area of more than 18,000 km^2 (a missile with the existing warhead can cover an area of 1,300 km^2) and will make it possible to ensure the maintaining of a rather high level of combat effectiveness of the nuclear missile submarines up to the beginning of the 1990's.

Due to the fact that in the first half of the 1990's, the service life of the nuclear missile subs will end and Great Britain will be forced to decommission all the nuclear missile submarines from the active fleet, at the end of the 1970's the Ministry of Defense conducted research involving the search for possible ways to further develop the nation's strategic forces. As the Western press has pointed out, regardless of the lack of an unanimous opinion on this question among military experts, in 1980, the English Conservative Government headed by M. Thatcher decided to replace the present nuclear missile subs with new ones armed with the American Trident-1 ballistic missiles.

This decision was taken by Great Britain after talks with the United States in the course of which an agreement was signed for selling Trident-1 missiles to the English. In addition, the foreign press has announced the reaching of agreement on the conditions for U.S. involvement in the creation and deployment of the new nuclear missile subs. It has been emphasized that these are similar to the conditions contained in the 1963 treaty. This treaty was the basis for the English program for building subs with Polaris missiles and made it possible for the United States to put their use virtually under its complete control. In accord with this treaty, as the foreign press has shown, the United States supplies Great Britain not only with missiles but also with everything needed for their daily operation, including the enriched uranium and certain other rare metals for the reactors. The United States trains the personnel at its own training centers and has the crews work through combat missions at the Eastern Missile Range as well as joint testing of nuclear ammunition at the range in Nevada; it also selects the targets for the English nuclear missile subs.

The plans of the English Ministry of Defense officially published in the press for the deployment of the new nuclear missile subs envisage even closer cooperation with the United States. According to them, the largest amount of work is to be done in the course of developing and building the submarines. There are plans to build four or five nuclear missile subs and the construction of four of them has already been approved by the government while the final decision on the fifth will be taken in 1982-1983.

The Western military specialists have commented on the difficulty of solving the problem of developing the new nuclear missile subs. This is caused by the fact that the English must develop a submarine which will embody the scientific and technical achievements in the second half of the 1970's and the beginning of the 1980's and not have analogues in other nations. Considering the possible use of the nuclear subs up to the first quarter of the 21st century, it is planned, in particular, to equip them with launchers (16 per sub) which provide the possibility of carrying the Trident-1 missiles in them and the Trident-2 in the future. The installation on the subs of new, highly efficient sonar systems, low-noise auxiliary mechanisms and more advanced control and communications equipment will help to reduce the vulnerability of submarines. In the interests of increasing their operational efficiency it has been proposed that a nuclear reactor be developed the core of which will have a longer service life. This will make it possible to increase the interval between the regular major overhauls. In addition, measures are being planned to reduce the time required to carry them out. Considering all of this, the nuclear missile sub will have a submerged displacement of 10,000-12,000 tons (the presently commissioned ones are 8,400 tons). In the aim of ensuring highly accurate firing, they will be equipped with American navigation gear using data from the NAVSTAR space navigation system. Judging from the materials in the foreign press, this system will make it possible purportedly to determine the sub's position with an accuracy of 16 m.

The building of all the new nuclear missile subs is to be carried out at the Vickers Shipbuilding Yard in Barrow. It has been announced that due to the firm's backlog of orders, construction on the head nuclear missile sub will not be started before 1983. It is expected to be commissioned at the beginning of the 1990's and over the following 4 or 5 years construction of the other three subs will be completed (the construction time of each is around 6 years).

According to the data of the English newspaper GUARDIAN, for arming its nuclear missile subs, Great Britain, in accord with the achieved agreement, will acquire

Trident-1 missiles in the United States. It is expected that at least 100 missiles will be purchased for a total of around 1 billion pounds sterling. In addition, there are plans to deliver fire control systems, warheads with an individual guidance system of the MIRV type (but without the reentry vehicles themselves) as well as the spare parts and equipment required for operation and maintenance.

Each of the missiles placed on the new nuclear missile subs, as was stated by the former British Minister of Defense, P. Pim, will carry eight nuclear reentry vehicles with a power of 100 kilotons each. Their separation system will ensure, in the estimate of Western military specialists, that one missile will hit an entire complex of targets located over an area of around 72,000 km^2 and each sub will be capable of destroying up to 128 targets at a range of over 8,000 km, while all four nuclear missile subs presently commissioned could make a nuclear strike only against 64 areal targets.

In accord with the announced plans, the English intend to develop and begin production of their own nuclear reentry vehicles for the Trident-1 missiles purchased in the United States. Their development is to be assigned to specialists at the Aldermaston Nuclear Center as they have experience in developing nuclear ammunition, including for submarine ballistic missiles. Here there is to be extensive use of data obtained in carrying out the "Shevalin Program." In addition, as was announced by the American NEW YORK TIMES, talks are underway for Great Britain to purchase fissionable materials in the United States for producing around 800 reentry vehicles for the Trident-1 missiles.

The deployment of the new nuclear missile subs, the Western press has pointed out, also requires the carrying out of additional work to ensure their combat employment and daily servicing. The most important of this work will be the enlarging of the nuclear sub naval base at Fasline which for a certain time will be used for basing and logistical support (including crew training) both for submarines with the Polaris-A3 missiles and the new nuclear missile subs with the Trident-1. In addition to this there are plans to modernize the missile arsenal in the town of Coalport for the purpose of creating conditions there for storing and servicing initially the missiles of both types and the nose cones for them and only for the Trident-1. Questions are being examined related to modernizing the control and communications system for the new subs by increasing its survivability and dependability. In particular there are plans to improve the super-long-wave communications system for the subs, including shore transmitters.

In modernizing the existing sea-based nuclear missile system and in planning to create a new one, the militaristic circles of Great Britain are planning to put pressure primarily on the Soviet Union. It is obviously no accident that the English newspaper DAILY TELEGRAPH wrote that the Trident-1 missiles, each of which is capable of carrying eight warheads, are aimed at the most densely populated cities of the USSR. All of this clearly shows the true intentions of those who, for the sake of achieving their hegemonistic aims, are endeavoring to involve mankind in World War III. For this reason the Soviet military should maintain the highest vigilance, they should strengthen combat readiness in every possible way and along with the men of the fraternal socialist countries dependably defend the victories of socialism and the security of their peoples.

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The articles by Soviet authors and the chronicle were prepared from materials appearing in the foreign press. This issue contains illustrations from "Jane's" and the following journals: AVIATION WEEK AND SPACE TECHNOLOGY, ARMADA INTERNATIONAL, ARMY, ARMY AND WEAPONS, WEHRTECHNIK, DEFENSE, DEFENSE INTERARMEE, INTERNATIONAL DEFENSE REVIEW, NATO'S FIFTEEN NATIONS, NAVY INTERNATIONAL, NAVAL AVIATION NEWS, NEWSWEEK, PARABELLUM, FLIGHT, FLUG REVUE, FLUGZEUG, AIR ET COSMOS, and AIR FORCE.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON INDOCTRINATION OF WEST GERMAN SERVICEMEN

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 8-11

[Article by Col N. Uvayskiy: "Brainwashing in the Bundeswehr"]

[Text] At the end of the 1970's the international situation deteriorated significantly through the fault of imperialist forces in the United States and other NATO countries. "Adventurism, willingness to gamble the vital interests of mankind for the sake of their own narrow selfish aims," noted Comrade L. I. Brezhnev in the Central Committee Accountability Report to the 26th CPSU Congress, "are particularly clearly manifested in the policy of the most aggressive imperialist circles." Pursuing a course of undermining détente and escalating the arms race, and intensifying a policy of threats and interference in the internal affairs of other nations, they seek to achieve military superiority over the nations of the socialist community, in order to dictate their own terms "from a position of strength." This is the objective behind a series of new militarist preparations, including an all-out buildup of nuclear missile potential, unprecedented growth of military expenditures, and escalation of militarist activities in the Near and Middle East, in the Indian Ocean, and in Central America.

A large share of the responsibility for aggravation of the world situation must be borne by the West German militarists, who have vigorously supported the decision to deploy on the European continent U.S. Pershing II missiles and land-based cruise missiles. They are doing everything possible to turn the Bundeswehr into the principal NATO striking force in Western Europe. According to figures in the foreign press, it currently comprises 50 percent of NATO ground troops in Central Europe, 50 percent of NATO ground air defense forces, 30 percent of combat aircraft, etc. Reorganization of the West German ground forces is currently in progress: combined units and units are being converted over to a new table of organization, the area of actions of naval forces is expanding, and troops are receiving more sophisticated hardware.

At the same time measures are being taken to intensify brainwashing of Bundeswehr personnel. As is emphasized in the foreign press, it is being carried out on the basis of a uniform plan drawn up in NATO and is permeated with a spirit of anticommunism and anti-Sovietism. The bourgeois mass media -- the press, radio, and television -- as if responding to command, are churning out phony propaganda stories one after the other, usually timing them to coincide with certain events in the lives of the peoples of the socialist countries (for example, with the holding of the Olympic Games in Moscow, the 40th anniversary of the Great Patriotic War of the Soviet Union, etc). The majority of these are for the purpose of justifying the arms race, the militarist activities of NATO, and its aggressive aspirations in various parts of the world.

The leitmotiv of all provocational propaganda campaigns is the myth of a "Soviet threat." Brazenly juggling the facts, West German bourgeois ideologues seek to "prove" the military superiority of the nations of the socialist community over the capitalist countries. It was clearly stated at the 26th CPSU Congress that "we have not sought and do not seek military superiority over the other side. That is not our policy. Nor shall we permit military superiority to be established over us."

The propaganda techniques and methods to which the Bundeswehr resorts, as well as the other NATO member nation armies, are becoming increasingly more sophisticated. Numerous interviews with various military and political figures appear in the press, and comparative tables and calculations are published. And all this is done only for the purpose of demonstrating "how seriously the West lags behind the East in military affairs" and to justify the arms race.

Brainwashing seeks to instill in West German military personnel a feeling of hostility toward the CPSU and the Soviet State, toward the world's Communist and worker parties, and pursues the aim of discrediting Marxist-Leninist teaching. One of the textbooks intended for use in ideological brainwashing classes, notes the newspaper DIE TAT, states: "Communism is the enemy not only of our governmental and societal system. It threatens each and every one of us. Communism is represented by the political, economic and military might of the East Bloc as well as by Communist parties and all Communist sympathizers." Thus a hatred toward all those who in one way or another oppose the policies of monopoly capital is instilled in military personnel.

In spite of the fact that anticommunism and anti-Sovietism permeate the entire system of personnel ideological indoctrination, Bundeswehr leaders strongly advocate escalating anti-Soviet hysteria to an even greater extent, demanding correction of "errors of omission" connected with the fact that not all officers and enlisted personnel yet perceive the danger of the "threat from the East" and do not understand "why, in the name of what they should be serving in the armed forces." In addition, they insist on the necessity of further expanding the scale of brainwashing youth in a militaristic spirit even prior to induction into the military, that is, at general-curriculum and vocational schools, at offices and enterprises, and in the home. And after this the West German militarists demagogically claim that Bundeswehr personnel are indoctrinated allegedly in a "neutral spirit," that they are not told against whom they are training to fight.

In the FRG many books, pamphlets and articles have been published which distort the combat history and purpose of the Soviet Armed Forces. This subject matter is also presented in a deliberately distorted manner in the ideological indoctrination system. The Bundeswehr, and NATO as a whole, personifying the arms race and a policy of threats, extortion and aggression, are portrayed as an "instrument of peace." Unbridled propaganda against the Soviet Army is waged in particular in connection with the events in Afghanistan. Articles have appeared in military journals in the

FRG, as if by the wave of a magic wand, calling readers to "draw lessons for Western Europe from the events in Afghanistan." The events in Poland are also being utilized for purposes of anti-Soviet propaganda. All these materials, served up in the form of "serious situation analyses," are intended primarily to get into the barracks, do their evil work and convince the West German soldier of the need to serve FRG monopoly capital "with faith and truth."

Praise for the militaristic traditions of the era of Hitlerism and dissemination of the ideas of revanchism and neo-Nazism continue to be specific elements in the content of ideological indoctrination of West German military personnel. In Bundeswehr top-echelon leadership positions the old cadres who became general officers under Hitler are being replaced by personnel who were senior lieutenants or captains when the war ended. Much in their ideological outlook has been inherited from the past, from Nazi times, and progressive views are alien to them. They owe their career to anticommunist, anti-Soviet convictions and to glorifying the revanchist policies of fascism. An official document put out by the West German Government -- a White Book on problems of security of the FRG and Bundeswehr development prospects for 1979 -- confirms that the 1965 directive "The Bundeswehr and Traditions" is still in force, a directive which encourages get-togethers with former members of the SS, Nazi officers and general officers, as well as indoctrination of soldiers in the traditions established by the Hitlerite Wehrmacht. At the same time it notes that today "dissemination of traditions should not be limited to display of military-historic events and description of the activities of the leaders of the past; it should also be based on discussion of the road traveled by the Bundeswehr."

Just what is this "road"? The Bundeswehr, an offspring of the "cold war," has been and remains in the hands of the bosses of the West German military-industrial complex an instrument of escalating tension and extortion. It embodies the worst features of the German military which was defeated time and again in the past: the spirit of Prussianism, arrogance, conceit, and a disinclination to accept the lessons of history. To call it "a factor promoting the strengthening of peace" and thus to attempt to impose "new" traditions is an example of the glaring mendacity of bourgeois propaganda.

The FRG armed forces have at their disposal an elaborate edifice for ideological indoctrination of military personnel, including a council attached to the Ministry of Defense, subdivisions at the main headquarters of the branches of the armed forces, and staff officers at the army corps-division-brigade-battalion echelon. As a rule subunit commanders serve as training group instructors in the line units. They are assisted by thematic materials, and every month a publication entitled "Information for the Troops" comes out, which has a clearly-marked anticommunist thrust. In organizing political indoctrination classes they frequently seek the assistance of local civilian propagandist cadres, representatives of bourgeois parties, and higher educational institution faculty members who are known for their reactionary views.

The Bundeswehr command authorities consider strengthening of comprehensive assistance, including methodological, to officers responsible for conducting ideological indoctrination classes to be an important task. A special school in the city of Koblenz, which is a Bundeswehr central school for training specialists in ideological indoctrination of personnel, is called upon to play a more active role in this area. According to a report in the magazine KAMPFTRUPPEN, it has now been designated a "coordinating research center" on these problems. Its tasks include maintaining constant contact with civilian organizations conducting ideological indoctrination of the German civilian population, with the NATO propaganda edifice, study of their experience and its adoption in practical military activities. According to the decision of top Bundeswehr officials, the school is supposed to "raise the level" of conduct of training methods courses for officers working in the area of organizing ideological indoctrination of military personnel. Unit and subunit commanders are enrolled in these courses. The school also prepares methods manuals and textbooks for training classes. The school's tasks are considered accomplished if a soldier in the Bundeswehr can answer the following questions: "Why am I serving and who threatens us?" As we see, we have come full circle. The term "threat" has once again come up, and in all treatises of the FRG propaganda edifice this is always a mythical "threat from the East."

The military chaplain service, which contains 400 chaplains (Catholics and Protestants), is quite active in the military. In their sermons, chaplains increasingly more frequently justify war, including war with the employment of nuclear weapons. In an article entitled "Is Rejection of Violence in All Instances an Ideal of Christian Faith?" The journal EUROPAEISCHE WEHRKUNDE emphasizes that "the church does not consider nuclear weapons immoral." Because the victory of atheism, the article goes on, would mean the end of the so-called "free world," and together with it the end of the Christian faith.

Reactionary parties and organizations poison the consciousness of military personnel: the CDU, the neofascist NDP, the KhIAG [expansion unknown] organization of former members of the SS, various associations of fellow countrymen and soldiers' associations, which have existed since the times of the Kaiser and Hitler, as well as the "Union of Bundeswehr Reservists," which was established in our time. Many of them maintain close contacts with military units, fostering propagation of a spirit of militarism in these units, organize get-togethers, political rallies and meetings with the participation of representatives of the Bundeswehr. Retired Brigadier General Koch-Erpach, addressing a meeting of the Bavarian soldiers' alliance, called for rehabilitation of the SS troops, declared by the Nuremberg tribunal to be a criminal organization. He expressed the opinion that condemning the SS troops "does not foster" strengthening of the morale of today's West German soldier. Officers of the 16th Motorized Infantry Brigade joined members of the KhIAG in placing wreaths on the occasion of a religious holiday -- "Memorial Day." A memorial stone graces the grounds of this brigade's headquarters, bearing the inscription: "What has been lost -- should not be considered lost." The West German antifascist newspaper DIE TAT explains that the meaning of the inscription is that the revanchists long to redraw the map of Europe to their own liking.

Bundeswehr command authorities make every effort to shield personnel from progressive ideas. For example, the authors of the appeal entitled "Soldier-80," prepared by a group of military personnel, were subjected to repressive measures. Its authors appealed to the FRG's military and political leaders to adopt a policy of disarmament and debunked the myth of "Soviet military threat." More than 1,000 military personnel placed their signatures on this appeal.

In spite of the ideological indoctrination campaign, the Bundeswehr command authorities express dissatisfaction with the state of morale of some personnel, since they have not yet been able to achieve a situation whereby every single soldier realizes "who threatens them." For this reason a "marked indifference" toward military service is observed on the part of some personnel. This was the conclusion reached, in particular, by West German correspondent of the newspaper DIE TAT Behler, who visited the 71st Motorized Infantry Battalion.

Nor are problems connected with the state of military discipline fully resolved. There occur instances of insubordination and of soldiers going AWOL. Alcoholism is rampant, becoming problem number one for the Bundeswehr, in the opinion of the magazine SPIEGEL. Alcoholism prompts up to 1,000 suicide attempts by military personnel each year. Drug addiction is also becoming a problem in the armed forces.

The main thing which concerns West German command authorities is the fact that some military personnel have an anti-military attitude. The Bonn militarists show consistency. They fear the policy of détente, which has deep roots. They believe that aggravation of the international situation and a campaign against détente can be utilized for further escalation of the war psychosis and even greater brainwashing of military personnel in an anti-Soviet and anticommunist spirit, for instilling in them hatred toward the peoples of the USSR, the GDR, and the other socialist nations.

We Soviet citizens look with confidence toward tomorrow. "Our people know: everything they have was created by their own labor and defended by their own blood," commented Comrade L. I. Brezhnev at the 26th CPSU Congress. In response the intrigues of the Western militarists, including in the FRG, all-out improvement in military skill and constant increase in vigilance and combat readiness are demanded of Soviet servicemen. Our party and our people expect this of us.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON U.S. PSYCHOLOGICAL OPERATIONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 11-15

[Article by Lt Col V. Tarakanov: "U.S. Psychological Operations Units and Subunits"]

[Excerpts] Psychological operations[1] occupy an important place in the aggressive plans of the U.S. military, specifying the conduct of political, military, economic and ideological measures which exert the desired psychological effect both on the enemy (the socialist nations and national liberation movements) and on neutral and friendly countries. A specific feature of such operations is the fact that influence on people is achieved primarily through the psychological realm -- a unique "bridgehead" of ideological views -- to evoke the required changes in their emotional state, and ultimately changes in their behavior in the desired direction. The true objectives of operations, their class character, reactionary and aggressive essence are carefully concealed.

U.S. military field manuals stress that the principal targets of psychological operations are the adversary's political and civic leaders, government officials and military personnel. Such operations are planned and executed with the aim of exerting appropriate influence on persons of authority in making political and other important decisions, as well as influencing the ability of military leaders to control the armed forces.

An elaborate system of military agencies has been established for the conduct of psychological operations, viewed by U.S. leaders as an inseparable component part of any war. Direct execution of actions is assigned to psychological operations units and subunits (some foreign periodicals call them "psychological warfare" subunits). Organizationally they are elements of the ground forces and can be placed under a U.S. armed forces unified theater command. It has been noted in the foreign press that currently there are four groups, 10 battalions and 20 companies, which consist of standard control agencies and subunits. The table of organization of the groups, battalions and companies varies according to assigned missions: they can include various (in type and number) subunits. Each subunit is designated by a two-letter identification index (AA, AB, ..., GA, FC). The first letter indicates functional designation (A -- control, management; B -- supply and logistic support; F -- processing and analysis of obtained information, preparation of propaganda materials; G -- publication of propaganda materials; H -- employment of sound equipment; I -- receiving and transmission of information with radio gear; K --

organization of operations of local radio stations, TV studios, printing plants). The second letter indicates specialization. We present below a list of these subunits (there are 27 of them). Number of personnel are indicated in parentheses.

Companies and battalions are formed from the listed subunits on the basis of assigned missions and conditions of their execution; the companies and battalions are joined into groups. A psychological operations section can be established at U.S. unified theater forces headquarters to exercise direct supervision over the operations of one or two groups. Figure 1 shows a variation of organization of psychological operations units and subunits in a theater [figure omitted].

There are four types of psychological operations battalions: general support, direct support, for working with prisoners of war, and for working with the civilian population on occupied territory (consolidating). U.S. field manuals specify a standard battalion organization, but their composition can change in relation to the specific conditions of the theater, the scale and nature of the assigned missions. They can operate independently, but as a rule are a component of a psychological operations group. The general support battalion (containing 270 men) is designated for conducting long-term psychological warfare against the enemy at the theater level (Figure 2) [figure omitted]. The direct support battalion (Figure 3) [figure omitted] is usually attached to the corps and supports execution of its combat missions. Battalions for working among prisoners of war and among the civilian population on occupied territory are established on the basis of concrete conditions.

Figure 4 [figure omitted] contains one of the most common variations of table of organization of a direct support psychological operations company (designation of a company detailed from a direct support psychological operations battalion for providing support of execution of division missions). Company strength runs up to 67 men.

The armed forces devote considerable attention to planning and organization of psychological operations. Field manuals recommend the following planning procedures: assign realistic objectives to executing personnel applicable to the character of combat operations; thoroughly analyze the situation; determine the source of information and target; specify the subject matter of the materials to be utilized for achieving the end objectives of the operation; choose the most appropriate forms of influencing the adversary and select appropriate executing personnel. Field manuals prescribe determining the sequence of planning and execution of psychological operations, taking into consideration first of all information on the adversary's vulnerable points. Western experts are of the opinion that the main role should be assigned to timely and accurate intelligence. Utilizing intelligence, experts assess the psychological situation[2] in the combat operations area and select that subject matter which may prove to be the most effective, as well as the optimal mode of influencing the adversary.

An automated information system, specially designed for optimizing and increasing the effectiveness of psychological operations, is extensively employed to provide thorough and comprehensive study of the operation target in the process of planning. Its adoption, as is noted in the foreign press, is dictated by the necessity of more thorough study of the historical, economic, and ethnic features of the areas and countries as a whole against which these operations are planned. As a result, one takes into account the socioethnic structure of the society, the language groups within the population, the elements of their culture, as well as descriptive characteristics of members of government, party leaders, and their policies. Capability to evaluate the effectiveness of psychological operations is provided for in this information system. Periodic informational materials are published on the basis of obtained data, and materials are also selected on the basis of specific individual requests.

Field manuals point out that operations planning should be conducted continuously and be flexible. Psyop targets which have not previously been considered should be evaluated and taken into account. Changes in policy or changes in the course of combat operations must be analyzed for plan revision and adjustment. At the final stage of planning there should be a preliminary check of all informational material on a specially selected audience, such as prisoners of war or persons familiar with the target of the operation.

The principal methods employed by the U.S. armed forces in the conduct of psychological operations are various propaganda techniques, including direct contact with the targets of the operation, showing motion pictures, use of public-address systems, dissemination of printed materials (in the form of leaflets, posters, magazines, newspapers, slogans, letters, etc), radio and TV broadcasts.

Field manuals specify for the conduct of subversive propaganda activities techniques of deliberate distortion of the facts, spreading of rumors and panic, and encouraging various prejudices, in order to generate doubts and suspicions, and to intensify differences between the people and the government of the opposing side, between the military and the civilian population. Malicious, groundless rumors are also employed to frighten the civilian population, to undermine the morale of the enemy's troops, and to force him to divert manpower, time and resources to combat them.

U.S. military and political leaders appraise psychological operations as an effective means of influencing the enemy. Manuals stress the need for their close coordination with combat operations and other military, economic, and political measures. It is believed that the conduct of psychological operations will substantially increase the effectiveness of the combat operations of friendly forces and will have an adverse effect on the enemy's combat readiness.

In conditions where the U.S. military is stepping up activities in the area of preparation for the conduct of psychological operations for achieving its aggressive aims, a high degree of ideological and psychological conditioning, political vigilance and constant readiness to offer a worthy rebuff to acts of ideological sabotage by the imperialists is demanded of Soviet servicemen.

FOOTNOTES

1. The term "psychological operations" has recently been increasingly employed by Western experts in place of the term "psychological warfare," since they feel that the latter term reveals the aggressive nature of U.S. policy.

2. The term "psikhologicheskaya obstanovka" [psychological situation, environment] is defined in U.S. armed forces manuals as the morale and psychological state of enemy military personnel and civilian population, developing under the influence of political, economic, social and military factors.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON U.S. FISCAL YEAR 1982 DEFENSE BUDGET

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 16-22

[Article by Candidate of Economic Sciences L. Nikolayev: "U.S. Defense Department Draft Budget for the 1982 Fiscal Year"]

[Text] The Soviet Union, consistently implementing a peace-seeking foreign policy, supports eliminating the threat of war and development of international cooperation. Imperialist reaction, however, actively opposes these peace initiatives. Comrade L. I. Brezhnev emphasized in the Central Committee Accountability Report to the 26th CPSU Congress that our time "is marked primarily by an intensive struggle between two directions in world politics. On the one hand there is a policy of holding the arms race in check, strengthening peace and détente, and defense of the sovereign rights and freedom of peoples. On the other hand there is a policy of undermining détente, escalating the arms race, a policy of threats and interference in the affairs of others, and suppression of the liberation struggle." U.S. imperialism is distinguished by particular aggressiveness. "Unfortunately," noted L. I. Brezhnev, "even following a change of administration in the White House, openly militant appeals and declarations can be heard from Washington...."

The draft U.S. military budget for the 1982 fiscal year (begins 1 October 1981), which has been submitted to Congress for its consideration, constitutes graphic evidence of the desire by the new U.S. military-political leaders to undermine the presently existing world strategic balance.

As is reported in the foreign press, the Reagan Administration is requesting a record military budget for the coming fiscal year. Budget appropriations for the federal "National Defense" program* are estimated at 226.3 billion dollars, 26 billion more than the Carter Administration's budget request in January 1981 (Table 1) [table omitted]. At the same time it is planned to appropriate for the 1981 fiscal year supplementary amounts totaling 6.8 billion dollars. In comparison with the current year's corrected budget figures, a 25.2 percent increase is proposed for "National Defense" appropriations in the 1982 fiscal year.

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* For a breakdown on the basic components of the U.S. military budget and financial categories, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 7, 1980, pp 23-25 -- Ed.

The five-year military program has also been substantially revised upward. According to figures in the U.S. press, in the 1986 fiscal year federal "National Defense" appropriations are to total 374.3 billion dollars (324.1 billion according to the Carter Administration's projection), with expenditures to total 342.7 billion dollars. As a result, as foreign experts note, there will be a sharp increase in militarization of the U.S. economy. The percentage share of military expenditures in the gross national product planned for the 1986 fiscal year is estimated at 6.7 percent, and will comprise 37.6 percent of the federal budget (as compared with 5.2 and 23.4 percent respectively in the 1980 fiscal year).

The bulk of official military appropriations (approximately 98 percent) are earmarked directly for the Pentagon. According to reports in the foreign press, in the 1982 fiscal year U.S. Defense Department appropriations will total 222.2 billion dollars, which is 44.2 billion dollars or 24.8 percent more than in the current year. The increase in these appropriations is running appreciably ahead of the U.S. inflation rate, and this is leading to a considerable increase in the volume of Department of Defense financing in real terms as well (in constant prices). Western economists estimate that in the 1981 fiscal year real growth in Defense Department appropriations will amount to 12.4 percent, and 14.6 percent in the 1982 fiscal year. This rate greatly exceeds the recommendations of the Washington (1978) meeting of the NATO Council, which, as we know, adopted a resolution calling for a 3 percent annual growth rate in the military expenditures of the NATO member nations.

A substantial increase in funding is also anticipated for the military programs of the Department of Energy. They will be increased to 5 billion dollars, 36.7 percent more than in the current year. It is planned to spend the bulk of these appropriations (3.1 billion dollars) on the development, purchase and testing of nuclear weapons. Large amounts are being requested for the manufacture of components for producing nuclear munitions, including the neutron bomb, and for building nuclear reactors for propulsion plants for navy surface ships and submarines.

Great importance is attached to strengthening civil defense and the mobilization readiness of the U.S. economy for war. Appropriations for these purposes are allocated to the federal Office of Emergency Planning. As reported in the foreign press, appropriations in the 1982 fiscal year are anticipated at 186 million dollars, which exceed by 14.8 percent the current year's figure. The General Services Administration is requesting 144 million dollars (a 17.1 percent increase over the current year) to build up stockpiles of short-supply materials and strategic raw materials.

U.S. military appropriations are not limited to the official military budget. A portion is concealed in so-called civilian sections of the federal budget. Presidential military assistance funds and the budget of the National Aeronautics and Space Administration (NASA) are of a clearly militarist thrust. As is reported in the U.S. press, it is planned to allocate 6.1 billion dollars to NASA in the 1982 fiscal year. The bulk of these appropriations are directly or indirectly connected with development of the multipurpose space shuttle system which, U.S. experts state, will be extensively utilized for military purposes (part of the cost of this program is financed from the Defense Department budget). It is planned to allocate more than 2.2 billion dollars, or more than 35 percent of the NASA budget in the coming fiscal year, just for orbital testing of the space shuttle "Columbia" (the first flight took place in April 1981) and continuation of building three more Space Shuttle orbital stages.

Bourgeois economists note that an examination of official budget documents shows that the enormous funds requested by the Pentagon are to be used primarily for modernizing the strategic forces as well as for raising the level of equipment and combat readiness of general-purpose forces.

Appropriations for the "Strategic Forces" program in the 1982 fiscal year are estimated at 17.4 billion dollars (including an additional Reagan Administration budget request of 2.9 billion), which is 31.8 percent more than in the current year (Table 2) [table omitted]. It is planned to allocate 1,291.5 million dollars for building one (the 10th) missile-firing nuclear submarine of the "Ohio" class, 906.9 million dollars to purchase 72 Trident I missiles, and 104.2 million dollars for research and development as well as military construction on the Trident program.

Work is continuing on modernization of the B-52 strategic bombers. As is reported in the foreign press, allocations for modifying 40 of these bombers as cruise missile launch platforms and on modernizing an additional 61 of these bombers (replacing and upgrading electronics) will total 356.2 million dollars in the 1982 fiscal year, including expenditures on research and development. In addition, the Reagan Administration intends to proceed with development of a new strategic bomber. A total of 2,121 million dollars is being requested in the coming fiscal year for purchase of the first five such bombers, and 335 million dollars for research and development.

Considerable attention is being devoted to expanding the manufacture of air-launched cruise missiles. In the 1982 fiscal year it is planned to allocate 605.4 million dollars for the purchase of 440 cruise missiles (784 million including research and development and military construction). Development of the new MX mobile-based intercontinental ballistic missile is proceeding at an intensive pace. Funds for its development are allocated to the basic "Research and Development" program. According to reports in the U.S. press, in the 1982 fiscal year they will total (including military construction) 2,951 million dollars, which is 83.8 percent more than in the current fiscal year. Also anticipated is a substantial increase in appropriations for development of the Trident II missile -- to 242.9 million dollars (97.6 million in 1981).

The large appropriation requests for the above-mentioned programs for developing and improving strategic weapons systems reflect, in the opinion of Western observers, the Reagan Administration's intention to achieve further buildup in the combat power of all components of the so-called U.S. "strategic triad."

Great importance is attached to the general-purpose forces development program. As is reported in the foreign press, in the 1982 fiscal year it is planned to allocate 89.5 billion dollars (30.1 percent more than in the current year) to this program. It is interesting to note, emphasizes the Western press, that these budget requests are being increased by the Reagan Administration by 15.1 billion dollars over the initial draft budget submitted by former President Carter, and comprising approximately 60 percent of all supplementary budget request amounts. As a result the precentage share of this program in the Defense Department budget will increase to a record 40.3 percent (36.8 percent in 1980).

Particular attention continues to be devoted to forces stationed in Europe or designated for redeployment to Europe in case of a military conflict. It is planned to allocate additional funds for increasing military supplies stockpiled in Europe.

Implementation of the programs of developing land-based cruise missiles and Pershing II intermediate-range ballistic missiles, which are to be deployed in a number of Western European countries, is continuing. According to figures in the U.S. press, the Pentagon is requesting 363 million dollars in the 1982 fiscal year for the purchase of 54 cruise missiles, a figure which is 2.2 times that of the current year. It is planned to allocate 219.7 million dollars to begin production of 39 Pershing II missiles.

Also planned is a substantial increase in the mobility of U.S. armed forces and accelerated formation of so-called "rapid deployment forces," to serve as an instrument of U.S. intervention in the affairs of other countries. This is attested to a certain degree by the record increase in appropriations for the basic "Airlift and Sealift Forces" program. A total of 4.4 billion dollars are being requested in the 1982 fiscal year, which is 46.7 percent more than in 1981, while allocations for this program will increase 2.1-fold over 1980. Active work is in progress both on modifying the C-5A and C-141 heavy military transport aircraft presently in use and on development of the new C-X transport.

Large funds are being allocated for military intelligence and development of communications, surveillance, command and control systems. Measures are being taken to increase the level of combat readiness and equipment of research components and to strengthen their link with the regular armed forces.

As regards distribution of the Defense Department budget among specific allocation areas, one's attention is drawn by a record rate of increase in funds allocated for purchase of arms and combat equipment. As is reported in the U.S. press, the Reagan Administration submitted a supplementary request of 19.4 billion dollars for such purchases (more than 75 percent of the total budget request). Thus in the 1982 fiscal year total appropriations for purchase of arms and combat equipment will amount to 68.5 billion dollars, according to the draft budget, which is 42.1 percent more than in the 1981 budget and 94 percent more than in the 1980 budget (Table 3) [table omitted].

Increase in appropriations for these budget items is running considerably ahead of the overall increase in the Department of Defense budget. As a result, the percentage share of this budget item will increase in the coming fiscal year to 30.8 percent in comparison with 24.8 percent in the 1980 fiscal year. Great importance is attached to continuous improvement of weapons and combat equipment and improvement in their performance characteristics. Research and development financing in the 1982 fiscal year is estimated at 21.7 billion dollars, which is 29.9 percent higher than the current year. Appropriations for military construction are growing more rapidly than other budget items, with the magnitude of these appropriations dependent to a considerable degree on the character and pace of rearmament. According to information in the foreign press, 5.7 billion dollars are being requested for military construction in the 1982 fiscal year, which is 67.8 percent more than in 1981, and 165.4 percent more than in 1980. This is connected in large measure with large-scale construction in the Indian Ocean and Persian Gulf area (for supporting the "rapid deployment forces") and construction of facilities needed for operation of new strategic weapons systems.

In distribution of the Defense Department budget among the armed services, the largest amount, as in previous years, goes to the Navy -- 70.7 billion dollars, or 31.8 percent of the budget (Table 4) [table omitted]. At the same time, as is noted in the foreign press, the percentage share of Navy appropriations is showing a somewhat downward trend. Air Force appropriations are rising at a more rapid rate. In the 1982 fiscal year they are estimated at 67.1 million dollars, or 30.2 percent of the budget. Budget requests for maintaining and equipping ground forces total 52.8 billion dollars (23.8 percent).

The main factor in the increase in funding each of the military services is an increase in amounts allocated for purchase of arms and combat equipment, research and development, combat training and logistic support.

According to reports in the U.S. press, it is planned to allocate 15.5 billion dollars (including 5.6 billion on the Reagan Administration's supplementary request) for purchase of ground forces arms and combat equipment in the 1982 fiscal year, which is 51.1 percent more than in the current year and 137.1 percent more than last year. The largest item is funds for purchase of artillery weapons, small arms, and armored equipment. In the coming year it is planned to allocate 3.9 billion dollars for these items (12.8 percent over the 1981 figure). More than half of these funds are earmarked for purchase of the new M1 tank. It is planned to finance the production of 720 of these tanks in the forthcoming fiscal year, for a total amount of 1,981.8 million dollars. The previous administration was planning to purchase 569 M1 tanks. There is also to be an increase in the budget request for purchasing new infantry fighting vehicles and self-propelled antiaircraft guns developed in the DIVAD project (to 949.2 and 337.9 million dollars effectively). Funds continue to be appropriated for the production of M113 armored personnel carriers, M110A2 howitzers, for modernization of the M60 tank, etc.

A substantial increase is anticipated in funds allocated for the purchase of missiles. According to reports in the foreign press, these appropriations will increase by 67.1 percent in the 1982 fiscal year and will total 2.6 billion dollars. A substantial percentage of the requested funds (more than 34 percent) will be spent on the purchase of 364 Patriot surface-to-air missiles (900.5 million dollars). It is planned to allocate 529.3 million dollars for the purchase of 795 Roland-2 surface-to-air missiles. Money is also being appropriated for the purchase of 2,544 Stinger missiles (224.7 million) and 1,075 Hellfire antitank missiles (131.8 million), for continuing purchases of the MLRS salvo-fire rocket system (210.7 million) and TOW antitank guided missiles (96.6 million). The budget request for army aircraft equipment purchases totals 1.8 billion dollars, which is 42.5 percent more than in the current year. More than 60 percent of these funds is earmarked for purchasing 96 UH-60A Black Hawk multirole helicopters and 8 AH-64 helicopter gunships.

Basic research and development programs for the Army include completion of development of the Pershing II missile (154.1 million dollars), as well as development of a 120 mm gun for the M1 tank (84.6 million), the AH-64A helicopter (100 million), infantry fighting vehicle and combat reconnaissance vehicle (107.9 million), the

Patriot surface-to-air missile system (58.6 million), the DIVAD self-propelled anti-aircraft gun (30.6 million), and the Hellfire antitank missile (24.8 million).

Appropriations for purchase of weapons and combat equipment for the Air Force are estimated at 24.6 billion dollars in the 1982 fiscal year (including the Reagan Administration's supplementary request for 6.9 billion dollars). This is 43 percent more than in the current year and 92.1 percent more than last year. According to information in the U.S. press, more than half of all funds will be spent on purchase of aircraft -- 14.5 billion dollars (38.9 percent above the current year's figure). These appropriations include the planned purchase of 60 A-10 attack aircraft (561.3 million), 120 F-16 fighters (2,069.6 million), 42 F-15 fighters (1,330.1 million), 2 E-3A AWACS aircraft (275 million), 8 KC-10A aerial tankers (480 million), and 6 TR-1 reconnaissance aircraft (142.4 million dollars).

Appropriations for the purchase of missiles for the Air Force are anticipated in the amount of 4.6 billion dollars, a 36.8 percent increase over the previous year (they are to be increased 2.1-fold over the 1980 fiscal year). As is evident from reports in the foreign press, plans also call for financing a purchase of Sidewinder, Sparrow, and Maverick missiles, land-based cruise missiles, etc.

Basic areas of research and development for the Air Force, in addition to development of the MX mobile ICBM, include the C-X transport (252 million dollars), the NAVSTAR satellite navigation system (170.1 million), land-based cruise missile (91.6 million) development projects, and improvement of the F-15 (57.8 million dollars) and F-16 (43 million dollars) fighters.

Appropriation requests for the purchase of weapons and combat equipment for the Navy total 28.2 billion dollars (including the Reagan Administration's supplementary request of 7.2 billion), which is 38 percent more than in the current fiscal year, and 80 percent more than in 1980. More than half of the supplementary appropriations are connected with expansion of the shipbuilding program. It is planned to spend 10.5 billion dollars on ship construction and refitting (a 33.4 percent increase over the previous year). These funds would finance initiation of construction on 17 ships and vessels, including an "Ohio" class missile-armed nuclear submarine (1,291.5 million dollars), 2 "Los Angeles" class torpedo-armed nuclear submarines (1,227 million), 3 "Oliver H. Perry" class guided missile frigates (2,946.3 million), and 8 vessels to serve as floating supply depots for the "rapid deployment forces" (682.4 million dollars).

In addition, appropriations totaling 658 million dollars are to be allocated for the purchase of components and assemblies with an extended production run, and for construction in subsequent years of one additional (the fifth) "Nimitz" class nuclear carrier. Also planned is modernization of the carrier "Oriskany" (364 million) and the battleship "New Jersey" (246 million dollars).

Appropriations of 6.7 billion dollars are being requested for the purchase of aircraft for the Air Force, a figure 44.3 percent larger than in the current year. The Reagan Administration's supplementary request for this budget item is for 1.7 billion dollars, and covers not only an increase in the previously planned equipment purchases but also starting up production on the AV-8B V/STOL aircraft (657 million dollars), the SH-2F ASW helicopter (238 million), and the purchase of

60 T-34C trainers (53.2 million). The largest aircraft purchase program for the Air Force is the F/A-18 program (the F-18 fighter and the A-18 attack aircraft). Appropriations totaling 2,476.5 million dollars are to be allocated in the 1982 fiscal year for the purchase of 63 F-18 and A-18 aircraft, or more than 28 percent of total appropriations on this budget item. Payments in this program are to be increased by 120 percent over the 1980 fiscal year.

It is also planned to finance the purchase of 30 F-14A embarked fighters (1,163.8 million), 12 P-3C shore-based patrol aircraft (475 million), 6 EA-6B electronic warfare aircraft (272.1 million), 18 SH-60B LAMPS Mk III ASW system embarked helicopters (772.1 million), 12 A-6E embarked attack aircraft (290.2 million), and 14 SH-53E heavy-lift helicopters (291 million dollars).

Appropriations of 2.7 billion dollars are being requested for the purchase of missiles for the Navy, which is 20.9 percent above the current year's figure. As is reported in the foreign press, in addition to purchase of Trident I missiles, plans call for financing the production of 88 Tomahawk sea-launched cruise missiles (236.6 million), 910 Sidewinder missiles (50.6 million), 905 Sparrow missiles (146.4 million), 340 Harpoon missiles (307.4 million), 1,095 Standard surface-to-air missiles (448.9 million), and 134 HARM antiradiation missiles (112 million dollars).

The largest amounts appropriated for Navy research and development projects are to be spent on development of the AV-8B aircraft (230.7 million dollars), the Tomahawk cruise missile (154 million), the SH-60B embarked helicopter (74.8 million), the CG47 guided missile cruiser (34.9 million), the F-18 and A-18 aircraft (175.4 million dollars).

The U.S. Defense Department draft budget for the 1982 fiscal year and the changes made by the Reagan Administration in the budget request, as well as the five-year military program, graphically attest to the endeavor on the part of U.S. military and political leaders to expand the scale of militarist preparations aimed at achieving military superiority over the Soviet Union and at implementing their aggressive schemes.

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SOVIET COMMENTS ON NATO CIVIL DEFENSE PLANNING

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 23-25

[Article by Lt Col V. Goncharov: "NATO Civil Defense Committee"]

[Text] In the estimate of the Western press, NATO military-political leaders view further development and improvement of the civil defense systems of the NATO member nations as an integral part of general preparations for war with the employment of nuclear missile or conventional weapons. This view is also held by the governments of the NATO member nations.

NATO leaders and the governments of the NATO member nations have specified the following principal tasks of civil defense:

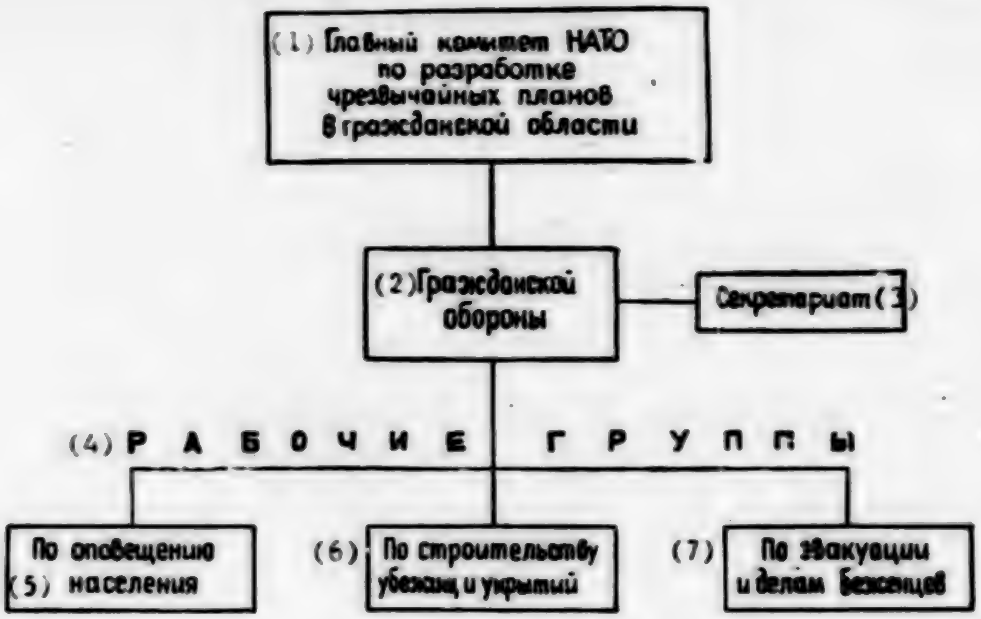
execution of an aggregate of measures aimed at ensuring the protection and survival of the civilian population in case of war;

establishment and training of manpower resources essential for neutralizing the consequences of enemy employment of nuclear and other mass destruction weapons;

preparation of military-industrial and other economic installations for uninterrupted operation in emergency conditions.

A civil defense committee has been established within the system of NATO administrative agencies for the purpose of working up proposals to be submitted to NATO leaders on general matters pertaining to the development and improvement of civil defense and coordination of activities in this area. It is a component of the so-called NATO main committee for civilian emergency planning (see diagram), which is responsible for planning and executing measures pertaining to preparations for shifting member nations over from a peacetime to a war footing, which are essential, in the opinion of Western experts, in order to ensure the survival and useful functioning of the civilian population and economy in conditions of a nuclear war.

The civil defense committee first and foremost studies matters of common interest to all the NATO countries, coordinates the activities of the corresponding national civil defense agencies, and draws up necessary recommendations on organization of protection of the civilian population in wartime.


(1) Главный комитет НАТО по разработке чрезвычайных планов в гражданской области
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Секретариат (3)
(4) РАБОЧИЕ ГРУППЫ
По оповещению (5) населения
(6) По строительству убежищ и укрытий
(7) По эвакуации и делам беженцев

Organization of the NATO Civil Defense Committee

Key:

1. NATO main committee for civilian emergency planning
2. Civil defense
3. Secretariat
4. Working groups
5. For alerting the civilian population
6. For construction of shelters
7. For evacuation and refugee affairs

At general meetings of the committee, held twice a year, matters of civil defense are examined which affect all or the majority of the NATO countries, for example: organization of systems for warning the civilian population of an enemy nuclear attack, exchange of information on the situation following nuclear attacks, prediction of nuclear contamination zones, etc. Considerable attention is devoted to study of the potential consequences of the effects of mass destruction weapons on major military-economic centers (probable targets) and conduct of necessary emergency rescue and repair activities in these areas.

At these meetings representatives of the various NATO member nations periodically report on measures being taken to improve existing civil defense systems. On the basis of analysis of obtained information, the civil defense committee each year prepares and submits to the NATO Council a report on the status of work in the civil defense area being done on a national scale, with recommendations on improving these activities. Recommendations ratified by the NATO Council are communicated to the appropriate civil defense agencies of the NATO member nations.

The working groups of the civil defense committee hold regular meetings under the chairmanship of the committee secretary or representatives of the NATO member nations. At these meetings personnel study various proposals and scientific projects in the area of civil defense and plan measures to improve various aspects of civil defense.

For example, recommendations drafted by the working group on alerting the civilian population are aimed at improving the capabilities of national warning systems to provide advance warning of threatened nuclear attack and radioactive contamination, primarily by establishing extensive networks of warning posts and equipping them with the requisite communications gear and modern radiation surveillance and dosimetric monitoring instruments.

As is reported in the foreign press, the most sophisticated and highly developed systems of this kind have been established in the United States, FRG, Great Britain, Canada, France, Norway, and Denmark. In particular, the United States has two federal centers and more than 2,300 warning posts, while the FRG has one national center and civil defense district (Landes-) warning centers, 25,000 warning posts in municipalities, and 12,000 at industrial enterprises. In Great Britain alert signals from the air defense operations center are transmitted to 250 monitoring points, and from them to 22,000 warning posts. In practically all these countries the warning systems are equipped with modern communications gear, which are capable of communicating alert signals to the civilian population.

Dense networks of stationary and mobile radiological surveillance and dosimetric monitoring posts have been established in the NATO countries (54,000 stationary posts in the United States, 1,300 stationary and 200 mobile posts in the FRG, 2,700 in France, 870 in Great Britain, and 1,600 stationary posts in Italy).

In recent years considerable attention within the framework of civil defense committee activities has been devoted to matters pertaining to evaluating the effectiveness of protective facilities systems in the NATO countries. The experts of the working group on construction of shelters note certain successes achieved in this area in the United States, Canada, Denmark, Norway, and the FRG. At the same time it is pointed out that in a number of countries, particularly in Great Britain, Belgium, France, and Italy, virtually no work has been done on building new shelters up until recently, while bomb shelters of World War II vintage and building basements were planned to be used for sheltering the civilian population. But this, in the opinion of foreign military experts, is clearly inadequate in conditions of a nuclear conflict. In conformity with the recommendations of the civil defense committee, some NATO countries are revising their programs for construction and utilization of systems of shelters which are adequately protected against the casualty-producing elements of a nuclear burst. British military and political leaders, for example, intend in coming years to step up activities in the area of building new and renovating existing shelters.

In the United States a survey has been made of existing buildings, with principal attention focused on identifying spaces suitable for shelter, providing protection primarily against the effects of penetrating radiation of a nuclear burst. Total accommodation in these shelters (231 million persons) exceeds the country's population. An analysis of the effectiveness of the shelter system, however, conducted by U.S. scientific research organizations, indicated that these facilities cannot even accommodate one third of the population (especially against weapons of mass destruction), due to their uneven geographic distribution, as well as inadequate protection afforded. As is noted in the U.S. press, future work in this area of civil defense is to focus particular attention on locating and identifying shelters which can be converted into atomic shelters, with their accommodation capacity increased to a level providing shelter to the entire population of large cities and military-industrial plants not scheduled for evacuation and dispersal out of the urban areas.

In the FRG and a number of other countries in Western Europe, construction of multiple-use shelters, that is, shelters which are used in peacetime as garages, warehouses, athletic facilities, trade facilities, etc, and become shelters in time of war is being encouraged.

The recommendations drawn up by the working group on evacuation and refugee affairs contain points on the need to evacuate the civilian population in advance from probable nuclear strike target areas, projected areas of heavy radioactive contamination, as well as from areas where combat operations are anticipated. In connection with this, the majority of the NATO member nations have drawn up plans for evacuating and dispersing the civilian population in case of a state of emergency.

In connection with the danger of occurrence of uncontrolled flows of refugees during war, which can greatly complicate troop transport and supply, the NATO civil defense committee recommended to the governments of the European nations that measures be provided for maximally reducing and regulating refugee flows. It is reported in the Western press that such control plans have been drawn up in conformity with bilateral agreements between European NATO member nations on receiving and providing for refugees in wartime. In particular, the FRG has agreements with France, Denmark, Belgium and Luxembourg.

Using the slogan of an imaginary "Soviet military threat" as a pretext, NATO military-political leaders are constantly focusing the attention of the governments of the NATO member nations on the necessity of further stepping up activities in the area of civil defense and are recommending a substantial increase in civil defense appropriations. They cite as an example such neutral countries as Sweden and Switzerland, where expenditures on civil defense comprise 15-20 percent of their military budgets. In Denmark, Luxembourg and Norway appropriations for these purposes comprise approximately 5 percent of the military budget. At the same time it is pointed out that in other countries this percentage is much lower (2.6 percent in Italy, 1.9 percent in the Netherlands, 1.5 percent in the FRG, and 0.4 percent in Great Britain). In the opinion of NATO leaders, this is clearly insufficient for accomplishing civil defense tasks in case of a nuclear missile war.

As follows from reports in the foreign press, NATO civil defense committee decisions are for the most part of the nature of recommendations. The government of each NATO member country determines what recommendations will be carried out and to what extent. Each country organizes its civil defense on the basis of its own political aims, specific features and economic capabilities. In the opinion of Western military experts, this explains the lack of a uniform civil defense system within NATO, as well as a varying degree of development of national systems.

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SOVIET COMMENTS ON NATO MILITARY TIES WITH SPAIN

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 25-26

[Article by Maj Ye. Zharkov: "Expansion of Spain's Military Ties With the United States and NATO"]

[Text] U.S. military-political leaders are devoting considerable attention to Spain due to the fact that it occupies an advantageous strategic position, and its territory could be utilized in a crisis situation as a bridgehead or airhead for transporting American troops to Europe, the Persian Gulf and other regions declared to be a sphere of "vital U.S. interests." U.S. Secretary of State A. Haig's trip to Spain in April of this year confirms the fact that Washington is seeking to establish closer ties with this country. A number of military and military-political problems were discussed during this visit, according to press reports, in particular the signing of a new U.S.-Spanish treaty and Spain's entry into NATO. At that same time Spain's armed forces chief of staff, Lt Gen J. Gabeiras, was on a visit to the United States, meeting with high Pentagon officials and visiting service schools and military units.

These activities are due in large part to the fact that on 21 September 1981 the treaty between these two countries expires (first signed in 1953 and renewed every five years with slight changes and additions). Everything indicates that the United States clearly has no desire to let slip out of its hands such a "tasty tidbit" as Spain, for if a new treaty is not signed, the Americans will be forced to dismantle their military bases on Spanish soil within a year's time. In addition, the Pentagon would very much like to deploy nuclear weapons on Spanish soil, which was prohibited by the 1979 agreement.

It is emphasized in the Western press that Spanish representatives are pursuing their own aims in negotiations with the United States. In order to fill in the possible vacuum in U.S.-Spanish relations after September of this year and to prepare for Spain's entry into NATO in the fall of 1982 (at the beginning of 1983 at the latest), the Spanish Government is seeking to enter into a one-year provisional treaty (a so-called "bridge-treaty"). Although the White House is not raising objections to the latter, it would much prefer to enter into a new five-year bilateral treaty on the same terms as with NATO member nations, such as with Portugal.

Foreign experts believe that in entering into a new treaty Spain will endeavor to establish greater control over the movement of U.S. troops, in order to avoid utilization of the Iberian Peninsula as an airhead or bridgehead without the consent of the Spanish Government, which could run counter to Spain's foreign-policy interests and reflect on its relations with other countries. In the course of negotiations, according to information in the foreign press, the Spaniards want to propose that the United States reduce the number of U.S. military bases and total number of American military personnel in Spain, personnel who presently total approximately 9,000, and approximately 11,000 including civilian personnel. Of the four large military bases (Torrejon, Moron, Zaragoza, and Rota), it is proposed that units and subunits remain only at the latter two.

Certain specific items must also be resolved. For example, the Spanish Government would like for U.S. military personnel stationed at the above bases to buy Spanish goods and foodstuffs. At the present time they are supplied directly from the United States. There are also a number of acute problems pertaining to relations between the personnel of U.S. military bases and the local populace.

One important point in the negotiations is an increase in U.S. military-economic and financial aid to Spain. In particular, Spain is very interested in a cooperative agreement with Washington on production and purchase of a new combat aircraft. According to the estimate of experts, Spain could purchase 145 aircraft worth a total of about 250 billion pesetas. At the same time Spain would like to obtain a license to build these aircraft at plants of the Spanish aircraft manufacturer CASA, which would make it possible substantially to reduce total outlays on the new aircraft. In addition, the government is interested in building a number of new military plants and in expanding several existing ones, inasmuch as they believe this would reduce unemployment.

There is an opinion in military circles that military assistance to Spain should be substantially increased. Experts calculate that Spain does not stand very hign among the 92 countries which received U.S. military assistance in 1981. U.S. loans to Spain for the purchase of arms and combat equipment have run 120 million dollars a year since 1977. In addition, Spain receives each year about 25 million dollars in the form of various grants and subsidies for holding military exercises and as military assistance. From 1977 through 1980 the United States has given Spain approximately 725 million dollars, while according to reports in the foreign press, Spain has requested for 1981 a 30 million dollar increase in loans.

The foreign press emphasizes that not everybody in Spain unconditionally supports the desire of its military and political leaders to enter into a new treaty with the United States and to join NATO. This is evidenced by the fact that some opposition political parties, a number of public organizations and figures, and many rank-and-file Spaniards are speaking out against joining this aggressive bloc, correctly concluding that membership in NATO will bring Spain nothing of benefit other than an increase in military expenditures, which will be a heavy burden on the shoulders of Spain's working people.

In spite of protests, however, the Spanish Government has declared its intention to request acceptance to NATO membership before the end of this year. In the opinion of the country's leaders, joining NATO will supposedly enable Spain to participate in reaching decisions on matters which for a long time now have affected Spain's interests. In addition, military observers believe that such a step will result in modernization of Spain's armed forces.

NATO leaders do not conceal their desire to expand NATO by accepting new members. Participants in the NATO Council meeting in Rome, for example, acknowledged for the first time that they officially considered the question of possible acceptance of Spain into this aggressive organization. This once again attests to the increasing aggressiveness of imperialism, particularly U.S. imperialism.

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PERCEPTIONS, VIEWS, COMMENTS

SOVIET COMMENTS ON U.S. ANTITANK WEAPONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 35-40

[Article by Engr-Lt Col N. Fomich: "U.S. Army Antitank Weapons"]

[Excerpts] The Pentagon, pursuing patently aggressive aims, is continuing to build up the combat capabilities of U.S. ground forces, devoting considerable attention to equipping them with various weapons for engaging tanks. Particular emphasis has been placed on this in the last decade.

U.S. military experts are of the opinion that combat against tanks, which in their view remain the principal ground troops striking force, is a most important component of combat operations. In connection with this the U.S. military is not only pushing quantitative and qualitative growth in antitank weapons, but is also working on the development of combined systems for detecting and destroying armored targets at considerable range (for example, the Assault Breaker system).

At the same time the United States is undertaking efforts in the area of implementation of the principle of "fire and forget." In particular, they have developed the M712 Copperhead 155 mm artillery projectile and the Hellfire antitank missile fired from helicopters; new types of homing heads for third-generation antitank missiles are also being developed.

U.S. experts are devoting certain attention to providing capability to fire antitank weapons during hours of darkness through the employment of appropriate night sights.

It is noted in the foreign press that U.S. ground forces are presently armed with diversified antitank weapons which provide the capability to hit armored targets across a broad span of ranges. In addition to developing modern antitank weapons, the United States is seeking new, more efficient methods of employing them.

In addition to the arsenal of above-enumerated antitank weapons, U.S. Army command authorities also plan the extensive employment of tactical aircraft against tanks, particularly the A-10 attack aircraft. Nor are they ignoring incendiary agents and mixtures, which can be used to put tanks out of commission. U.S. military experts are of the opinion that under certain conditions tactical nuclear weapons can also be employed, particularly neutron weapons, the question of Western European deployment of which has once again been raised by Washington.

Widely publicizing U.S. measures to improve existing and develop new antitank weapons, the Western press, taking refuge behind the notorious myth of a "tank threat from the East," is focusing the attention of its readers on the allegedly forced defensive nature of these projects. Foreign military experts, however, do not conceal the fact that these weapons can also be aggressively employed in the conduct of offensive combat operations.

PHOTO CAPTIONS

1. p 36. Viper shoulder-fired antitank missile launcher.
2. p 36. AN/TAS-4 infrared night sight mounted on a TOW antitank missile launcher.
3. p 37. M901 self-propelled launcher.
4. p 38. AH-64 antitank helicopter firing a HELLFIRE missile.
5. p 39. U.S. M60A2 tank.
6. p 39. American PC30 MLRS.
7. p 39. Diagram of combat employment of the Assault Breaker system

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SOVIET COMMENTS ON U.S. AIR FORCE MATHEMATICAL MODELING METHODS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 43-48

/Article by Candidate of Military Sciences Engr-Col D. Sokolov and Candidate of Physical-Mathematical Sciences Engr-Capt A. Danilov: "Mathematical Modeling of Combat Operations in the U.S. Air Force"]

[Text] U.S. militarist circles view the Air Force as one of the principal means of carrying out their aggressive schemes. Constantly increasing its combat capabilities, the Pentagon extensively utilizes scientific and technological advances, in particular mathematical simulation of combat employment of aircraft.

The U.S. military press notes that the Air Force was the first military service to begin employing modern mathematical methods of studying and evaluating various problems and the first to use computers. Initially they were utilized to study the performance characteristics of future aircraft and the elements in their design. At the same time airborne computer systems were designed and built, and individual management and control processes were automated. As mathematical methods evolved and computer hardware became perfected, models and methods of evaluating the effectiveness of combat employment of the Air Force began to be developed. U.S. Air Force command authorities presently have at their disposal more than 300 mathematical models which they use in conducting various research and development and military planning. We shall examine several models of evaluation of the effectiveness of aircraft combat employment on the basis of information published in the foreign press.

The following classification of models is used in the United States: war games, stochastic and analytical models.[1] In contrast to the Army, the Air Force has not devoted much attention to the development of war games, since in the opinion of U.S. experts they should apply to all military services and arms, and therefore questions pertaining to combat employment of aircraft are not a basic element of these games. Proceeding from this point, air-force experts concentrated main efforts on stochastic and analytical models.

Historically three levels of models developed in the Air Force: single vehicles (fixed-wing aircraft, rotary-wing aircraft); tactical (squadron, wing); larger scale (combined units, large strategic formation, air-force theater or specific region commands).

The first mathematical models describing the combat employment of air forces appeared in the United States at the beginning of the 1950's. They were used primarily to evaluate one-on-one engagements: a fighter attack on a hostile aircraft or an aircraft attack on ground targets. The overwhelming majority of models were stochastic. They did not come into widespread use -- they were employed in only a few instances in scientific research projects.

Models of one-on-one engagements continued to evolve in the 1960's, with some of them of a composite nature: an aircraft's movement along its flight trajectory and its delivery of fire were described by analytical relations, while decision elements in the course of combat were expressed stochastically. There appeared during this period mathematical models of engagements of single aircraft (based on games theory) and small groups (up to and including the squadron). At the same time models of large-scale operations were being developed in the United States (at the level of the army, army group, and theater forces), pertaining to combined combat operations by ground and air forces, in which the participation of air forces is taken into consideration in one way or another: ATLAS (A Tactical, Logistical and Air Simulation), GACAM (Ground-Air Campaign Model), TBM (Theater Battle Model), plus a number of others.

During this period there developed in the United States two basic approaches to simulating large-scale combat operations. The first was based on synthesis of diversified weapons and reducing them to a small number (2-5) of types of arms, each of which is described by a set of generalized characteristics. The result was various indexes of commensurability of weapons and military equipment. In particular, firepower indexes[2] were developed in the ground forces. The Air Force did not adopt this methodology and employed for the most part the second approach, which consisted essentially in simulating the employment of actual individual weapons, although there was synthesis of weapons of a single type, performing identical missions and possessing similar performance characteristics.

In the 1970's U.S. experts began developing a new generation of Air Force combat operations models on a tactical and larger scale. Considerable attention was devoted to problems of target detection and force control in conditions of conduct of electronic warfare; problems of logistic support of air combat operations were also investigated.

At the same time a large number of models were developed for the Army for determining the effectiveness of helicopter gunships; initially combat employment of individual helicopters was modeled, with different armament variations, against tanks and personnel, while actions of groups of helicopters began to be modeled in the latter half of the 1970's. By the end of the 1970's modeling in the Air Force had gone beyond the framework of conduct of scientific research and had become an instrument for preparing data for decision-making in the course of planning aircraft construction and utilization, as well as in the process of combat training. According to information in the foreign press, presently 25 percent of all mathematical models used by the Joint Chiefs of Staff are air-force models. We shall briefly examine three groups of models; U.S. experts stress that some of these are general-purpose and permit a varying level of clustering (in such cases they are arbitrarily assigned to that level at which they are utilized most frequently).

Models for evaluating the effectiveness of individual fixed-wing and rotary-wing aircraft possess a high degree of detailing of the processes being simulated and take into account a large number of factors which influence the engagement outcome. This in turn leads to substantial time losses, especially for preparing the battle scenario and input data, and feeding this data into the computer. The simulation results in this instance are not only of independent significance but also as a rule constitute input data for models of a higher level.

The TAC AVEGER (Tactical Air Capabilities, Avionics, Energy, Maneuverability, Evaluation and Research) model has been developed by the U.S. Air Force to evaluate the combat capabilities of aircraft in close air combat. This model enables one to simulate 5 minutes of air combat and simultaneously to compute approximately 30 one-on-one engagements. In this model the processes of fire delivery and maneuver are formalized in coordinate space. It is a composite model: movement of aircraft is expressed analytically, while selection of a given maneuver is performed stochastically.

Individual elements of air combat, namely target detection and entry into the potential attack zone, are evaluated with the aid of the COLLIDE (An Aggregated Conversion Model for Air Combat) model, which makes it possible to figure probabilities of realization of indicated combat elements with specified target characteristics and intercept tactics. The results of a fighter-interceptor attack on a single target are determined with an ICAP (Interceptors and Combat Air Patrol) model. This model can also be used to describe the combat actions of several interceptors in repulsing a strike by a group of aircraft.

The EVADE-2 (second modification) analytical model has been developed to evaluate aircraft survivability under various conditions. This model enables one to estimate damage to an aircraft following a specified route of flight within the boundaries of effective air defense zones, with speed known for each point in time. Functioning of the latter is modeled in detail, taking into account the specific features of fire control systems. This model can also be used for a preliminary evaluation of selected routes and for determining required air defense forces to repulse an enemy air attack.

The TAGSEM (Tactical Air-to-Ground System Effectiveness Model) model is used to evaluate the effectiveness of a single aircraft against ground targets. This model calculates damage inflicted on the enemy on the basis of a selected scenario. In addition, it enables one to compare the effectiveness of different strike aircraft armament configurations. It is noted in the foreign press that this model is superior in capabilities to such earlier developed models as the TEM (Target Engagement Model) and MEM (Mission Effectiveness Model), which are still being used in the United States for similar purposes.

In the last decade considerable attention has been devoted to the development and utilization of mathematical models for evaluating the combat actions not only of Air Force aircraft but also of Army and Navy fixed-wing and rotary-wing aircraft. In particular, the effectiveness of various helicopter-mounted antitank weapons is evaluated with the aid of the IEM (Helicopter Individual Engagement Model) analytical model, which describes a helicopter gunship engagement of an individual ground target protected by air defense weapons. It takes into account helicopter and target performance characteristics, as well as a number of situation factors (personnel reaction speed on both sides to change in the combat situation, employed tactics, etc). As is emphasized in the foreign press, simulation results are not only of independent significance but are also utilized as input data for a larger-scale SEM model (Helicopter Sortie Effectiveness Model), based on game theory. In the opinion of U.S. experts, the IEM also provides the capability to simulate engagement of a tank battalion by several helicopters.

Tactical-level models describe joint combat actions by air-force subunits and units (squadron, wing). As a rule they are on a larger scale, that is, similar items are joined into groups, which are viewed as a unified whole.

A considerable number are designed for evaluating the actions of fighter-interceptors in repulsing a massed enemy air attack. With the aid of the CAM-SAAB model (Countering Antiship Missiles -- Simulated Air-to-Air Battle), for example, one calculates bomber (missile-firing aircraft) losses resulting from attacks by air defense fighters. The model accommodates examination of targets consisting of up to 50 groups of aircraft (of not more than 30 aircraft in number), while the maximum number of fighter-interceptors is 100. It is an analytical model, but it includes a number of stochastic elements. It can be used to determine the losses (in aircraft) of the opposing sides, as well as the number of air-to-surface missiles fired by enemy aircraft. The latter data are subsequently utilized as input information into the CAM/SAM model (Countering Antiship Missiles -- Surface-to-Air Missile Submodel), which is used to estimate the effectiveness of a missile attack.

Similar problems are solved by the ESCAP-66 model, which consists of two self-contained submodels. The first is used to describe target search and detection variations by stochastic methods, and the second -- for an analytical estimate of the effectiveness of air-to-air missiles and fighter-interceptor airborne weapon control systems.

The MABS (Mixed Air Battle Simulation) stochastic model was developed to determine the capabilities of air defense systems; it describes the actions of antiaircraft missile systems, antiaircraft artillery and fighter-interceptors in repulsing coordinated aircraft and tactical missile strikes. With this model one can take into account the actions of 255 ground air defense weapons (antiaircraft missile systems and antiaircraft artillery) and 100 fighter-interceptors (maximum number of targets -- 800). It is utilized together with the TIP (Terrain Simulation and Intervisibility Model) and AGAIR (Air-to-Ground Intervisibility Assessment Program) models, with the aid of which part of the input data is prepared, which makes it possible to simplify the structure of combat actions in the MABS model.

The STAB-2 model was developed for U.S. naval aviation. This model solves problems of repelling enemy air attacks with carrier-based fighters. On the whole it is analytical, but it includes certain stochastic elements. In addition to its basic function (figuring losses sustained by the opposing forces), STAB-2 makes it possible to study the influence of such factors as control of fighters, employment of electronic warfare, plus certain other factors on the outcome of combat.

Larger-scale models. This article examines only those which are intended for analysis of problems of combat employment of air defense forces and weapons, theater tactical air, control and logistic support, and are widely used by U.S. Air Force command authorities.

The IWGM (Interceptors War Game Model) stochastic model was developed for determining the probable results of repulsing an enemy air attack by an air defense system. Data obtained with the aid of this model is used to draft proposals on determination of an optimal composition and points of deployment of North American Continental Air Defense forces. The model examines the following processes: bomber attack, target search and detection by ground radars, selection of fighter-interceptor scramble airfields (according to the criterion of repulsing an attack as quickly as possible), target intercept, return of fighters to the closest airfields and readying them for turnaround. The IWGM makes it possible to simulate the actions of a separate element and to perform larger-scale simulation of like groups (up to 100 elements in each).

The TACOS-2/AF2 stochastic model (second modification of the TACOS-2 model for the Air Force) can also be used to analyze the effectiveness of an air defense system. With this model one can estimate losses sustained by the opposing sides in a specified period of combat actions, reliability and quality of control of forces and weapons, and effectiveness of employment of electronic warfare gear. This model takes account of coordination and communications with ground forces. The model has the capability of figuring for up to 255 ground weapons (antiaircraft missile systems or antiaircraft guns), more than 2,000 aircraft and more than 250 enemy aircraft attack routes. In solving problems ground weapons are considered to be stationary during combat, while reconnaissance aircraft are not considered as targets.

The NEWAIR analytical model was developed to estimate the combat capabilities of air forces stationed in the Central European Theater. This model enables one to figure (taking into account employment only of nonnuclear weapons): aircraft losses suffered by the opposing sides; damaged caused to runways, bunkers and shelters, as well as aircraft in shelters and on the flight line; required number of close air support sorties and sorties to seal off tactical areas of operations. The model can contain up to 150 air bases and approximately 40 types of aircraft.

The CONTACA analytical model is used for distribution of air forces among missions in conditions of conduct of theater-level combat operations. The following input data are fed into the model: aircraft types (up to 6), number of aircraft (broken down by type), likely losses to the opposing sides and total number of sorties allocated for accomplishing each mission. As a result of simulation, one determines air operation plan variations for both sides, which are subsequently utilized as a rule in models designed for assessing air-force combat capabilities.

Problems of distribution of air-force efforts and calculation of a reasonable air-force structure can be studied with the aid of the FORDET (Force Determination Model) model which, in the opinion of U.S. experts, makes it possible to give an overall evaluation of the armed forces of the United States and its allies. It employs linear programming methods for determining an armed forces structure which would satisfy imposed limitations and demands of various types. This model can

Operating Specifications of Mathematical Models

Designation of Model	Where Utilized	Input Data Preparation Time (Collection/Input), days	Solution Time (Computer), minutes	Annual Utilization Frequency
COLLIDE	Air Force research and analysis directorate	30	Less than 1	120
EVADE-2	Army weapons systems analysis directorate	.	.	50
TAC AVEGER	Air Force Headquarters	./30	4	In continuous use
TAGSEM	Weapons testing and tactical fighter tactics development center	60/2	3	50
IEM	Army combined-arms combat development directorate	30/30	10	5-10
SEM	Same	./7	5	5-10
CAM-SAAB	Navy problems analysis center	180/14	Less than 1	100
IWGM	NORAD air defense system headquarters	30/7	5	In continuous use
MABS	Proving grounds directorate	60/14	20	Periodic use
NEWAIR	Technical center, Headquarters, NATO Joint Forces Supreme Command, Europe	./7-14	480	Same
TACOS-2/AF2	Air Force Headquarters (air defense technical center)	0.5-30/7	0.5-60	25-50

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take into consideration up to 250 ground troops and air forces units (the division is adopted for the former, and the air squadron for the latter). It is used together with others, in particular: RESOURCE (performs a cost estimate on each unit), ANALYSIS (determines the potential of an elaborated organizational structure variation), and YGATES-2.

As is emphasized in the foreign press, results of mathematical modeling are extensively employed in U.S. Air Force scientific research organizations, as well as in planning and management agencies. Operation information on certain models attests to this (see table).

However, while noting the fine characteristics of the computer programs, which can solve one problem variation within a few minutes, U.S. military experts draw attention to the considerable time required to gather information and feed it into the computer. In their opinion this is due not only to the large volume of input data but also to the necessity, in most cases, of elaborating a complex, detailed combat scenario.

According to information in the foreign press, U.S. Air Force modeling of combat operations is developing in the following principal directions.

1. Testing and verification (checking models on the basis of data obtained in local wars, proving-ground and field tests) of prior elaborated mathematical models. U.S. Air Force command authorities are currently devoting considerable attention to field testing for the purpose of obtaining large quantities of input data both for evaluating the combat capabilities of weapons systems and for verification of developed models with greater reliability.

2. Elaboration of combined models of theater combat operations. In the opinion of U.S. experts, it is inexpedient to develop isolated models of combat operations of individual services and arms at this level. They do not, however, apply this to models of control of forces and weapons and their logistic support.

3. Combined utilization of a number of detailed models. Increasing the degree of clustering of large-scale models leads to significant errors and is one of the reasons for negative verification results. Some U.S. experts believe that the present state of mathematical modeling permits more detailed description of individual processes of combat employment of air forces, but due to a differing level of scale of models, their unification into a single model frequently proves unwarranted or impossible. In this case it is considered advisable to solve a complex problem by the combined utilization of separate models.

4. Development of air reconnaissance, control and communications models. Principal efforts are concentrated on formalized combat situation decision-making algorithms, in order to avoid elaboration of detailed scenarios.

FOOTNOTES

1. For more detailed information on classification of models see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 8, 1980, p 27-28 -- Ed.

2. Sometimes they are called indeksy ognevoy moshchi [firepower indexes] or boyevyye potentsialy oruzhiya [weapon combat potentials]. See ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 12, 1979, pp 15-18 -- Ed.

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PERCEPTION, VIEWS, COMMENTS

SOVIET COMMENTS ON NEW NATO AIRCRAFT IDENTIFICATION SYSTEM

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 8, Aug 81 (signed to press 7 Aug 81) pp 49-52

[Article by Candidate of Technical Sciences Engr-Lt Col V. Tamanskiy: "Elaboration of a New Identification System in NATO Air Forces"]

[Text] Command authorities of the aggressive NATO bloc, proceeding from views on massive employment in a future war of aircraft capable of operating across a wide range of altitudes and speeds, day and night and in all weather conditions, are devoting serious attention to the problem of their identification. In the opinion of Western military experts, the fact that airspace is heavily saturated with aircraft of various types and classes presents an air defense system with a rather complex problem -- to identify hostile air targets and to deliver fire on them in a limited period of time and with a high degree of reliability. According to a former U.S. deputy secretary of defense for research and development, reliable identification of friendly aircraft, hostile aircraft, and the aircraft of neutral countries is an important problem both from a technical and operational standpoint.

Judging from reports in the foreign press, today the majority of NATO member nations employ the U.S. Mk 10 radar identification system. It operates on the following principle. The system's interrogator (it is usually employed together with ground detection and guidance radar) forms and sends in the direction of the unidentified target interrogation signals at a frequency of 1030 MHz. Friendly aircraft, equipped with a special device (transponder), after receiving and decoding the interrogator signals, form and send into space response signals (at a frequency of 1090 MHz). They are received by the interrogator, which decodes them, verifies their correctness and, on this basis, establishes identification. Simultaneously it can determine range to target on the basis of response signal time delay, and bearing to target on the basis of antenna angular position at the moment the transponder signals are received. It is noted in the foreign press that the system's strong points include simplicity and capability of quickly accomplishing the task of identification.

At the same time it is believed that in complex combat situation conditions, in particular with the massive employment of aircraft and heavy electronic countermeasures, the Mk 10 system is characterized by serious deficiencies. One of these is connected with the fact that the system utilizes two fixed frequencies known in advance (1030 MHz for interrogation and 1090 MHz for response). Therefore, in the opinion of foreign military experts, it can be comparatively easily neutralized by radiating pulse or continuous-wave signals at these frequencies. A second weakness is the inadequate security of the identification process, which can enable the opposing side to intercept and learn the combination and sequence of interrogation and transponder signals. Possessing such information and suitable airborne equipment, enemy aircraft will be capable of penetrating the air defense zone without receiving fire.

In addition, the system is poorly adapted to operate with a large number of aircraft in the covered airspace. In such conditions it generates its own interference, since transponder signals are radiated by an omnidirectional antenna and can be received simultaneously by several interrogators (both those which have and have not sent out interrogation signals). In this case the transponder signals are perceived as nonsynchronous interference, which complicates the identification task. It can also happen that interrogation signals will be received by several aircraft positioned at the same bearing but at different ranges. The emitted transponder signals are more than the interrogator decoding device can handle, and thus disrupt the identification process. The greater the number of aircraft in the air and the greater the number of interrogators performing identification, the more difficult it is to eliminate the effect of self-neutralization of the identification system.

Other shortcomings are also noted. In particular, radiation of transponder signals with an omnidirectional antenna can enable the enemy, employing equipment operating in the 1090 MHz band, with the requisite passband, to pick up transponder signals and use them to detect and track air targets at great distances.

At the present time, according to reports in the Western press, some NATO countries, particularly the United States, the FRG, and Great Britain, are working on development of a new, improved identification system. Each of these countries is engaged in fierce competition to have its equipment adopted as the NATO standard. Such acceptance promises enormous profits to the companies involved, since it will be necessary to produce a large number of sets of equipment (representing a total value of 2 billion dollars, in the estimate of the foreign press), for the realm of application of identification equipment has greatly expanded. Today such gear would be installed not only on aircraft but also on surface ships and combat equipment on the battlefield (see figure) [not reproduced].

Selection of frequency band is considered one of the important problems involved in designing a common identification system for all NATO countries. As is noted in the foreign press, experience amassed in the process of development and operation of such systems indicates the necessity of utilizing several frequency bands: from the decimeter band (employed at the present time) to the optical band (in future systems). In particular, the 1000 MHz band would be kept at least for the next 20 years, since not only military aircraft but also civil aircraft of foreign airlines are equipped with MK 10 system gear, and it would be very difficult for many countries to replace this equipment in a short period of time. Other frequency bands (for example, 3000, 5500, 10,000 and 15,000 MHz), which are in the centimeter band, are viewed as possible, for with an increase in frequency, there is a decrease in the physical size of antenna systems and an increase in their front-to-rear factor and the carrying capacity of interrogation and transponder channels. Foreign experts claim that this will make it possible to speed up and improve the jamming resistance and security of the identification process by employing broadband (pseudonoise) signals or by stepwise interrogation (transponder) signal frequency retuning.

In the opinion of foreign experts, also most probable is employment of the optical band, which is designated specially for solving the problem of identifying tanks on the battlefield. Its capabilities are limited, however, in adverse weather conditions (due to absorption and scattering of transmissions in this frequency band by clouds, fog, etc), and therefore possibilities of utilization of the millimeter frequency band are also being studied. At the same time it is noted in the foreign press that employment of several frequencies in an identification system also contains a serious deficiency, since this would require several transponders on board an aircraft, which will lead to an increase in equipment size, weight and power requirements, and decreased reliability. A NATO common identification system is being developed taking into account the specific features of frequency bands as well as the above-mentioned drawbacks.

In recent years the United States has developed the new Mk 12 system, which is being used both by the U.S. Air Force and those of several other NATO countries. However, an attempt to get all NATO members to agree to adopt it as a common system has been unsuccessful. Judging from reports in the Western press, the principal opponents were the FRG and Great Britain, which have their own projects to develop a similar system. Another important reason for the negative decision was the fact that the Mk 12 essentially is an improved version of the Mk 10 system. The only difference between them is the fact that the new system employs a special additional identification mode, which uses a complicated cryptographic method of encoding interrogation and transponder signals.

In this instance the interrogator and transponder form a complex sequence of signals, whereby interrogation signals are transmitted several times, and their meaning is determined by the nature of the transponder signals, while the cryptographic codes are changed at specified time intervals. As is noted in the foreign press, the Mk 12 has one clear advantage, which is the compatibility between the old and new systems both in frequency band and employed identification modes (the other modes remain unchanged, except for the special cryptographic mode). This makes it possible simultaneously to employ the Mk 10 and Mk 12 systems, which is especially important for nonmilitary aircraft, which can continue to use the old equipment. Another advantage of the Mk 12, in the opinion of foreign experts, is high stability and difficulty of breaking the coding system, which increases reliability of solving the identification problem. At the same time all deficiencies inherent in the Mk 10 are also characteristic of the Mk 12.

Development of an identification system in the FRG (designated "Caprice") was begun in 1970 by Siemens. The main requirement on the system was that it identify not only air targets but also tanks and other armored vehicles on the battlefield. Development was based on a new idea: the system interrogator would operate at the frequency employed by target detection, tracking and weapon control equipment. West German experts state that this will lead to the necessity of transmitting interrogation signals both from air target long-range detection radars (they operate in two principal bands -- 1300 and 3000 MHz) and from fire control radars operating in another band. The latter is considered particularly important for accomplishing identification tasks for tactical air defense, which employs diversified weapons against air targets, including those flying at low altitudes.

Siemens has developed several versions of identification equipment operating in various frequency bands and intended for experimental testing both on aircraft and on ground armored vehicles (in particular, one is to be installed on the Gepard self-propelled antiaircraft gun). Interrogation signals are transmitted at a frequency of 3000 MHz (detection radar operating band) and 15,000 MHz, at which the 35 mm antiaircraft gun fire-control radar operates. Experts in the FRG are of the opinion that this solution to the identification problem will most fully conform to the conditions of engaging highly-maneuverable low-flying air targets, which remain for a very short time within a gun's area under fire. This identification equipment variation will require that friendly aircraft (helicopters) carry two transponders, operating in the 3000 and 15,000 MHz bands.

Experimental models also include units which operate in the optical band (wavelength in the order of 1 micrometer). They would be carried by direct air support aircraft and antitank helicopters. In this case tanks should carry appropriate transponders operating in the optical band.

It is noted in the foreign press that in spite of the existence of several versions of new identification equipment, none has yet been approved as a common system for all NATO countries. This is due to a lack of unity of views on solving this problem on the part of U.S. experts and their Western European bloc partners.

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